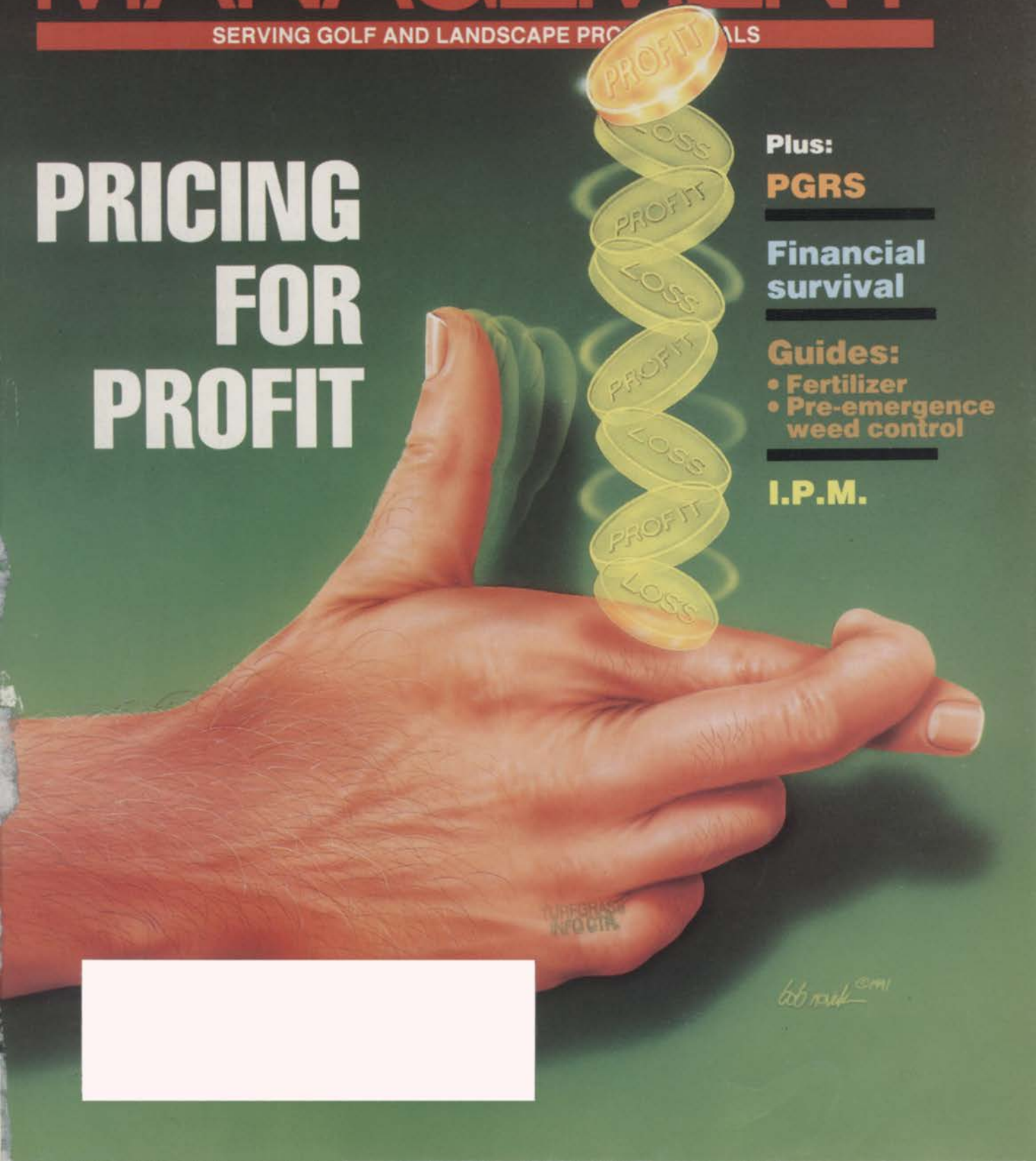
$3.00/FEBRUARY 1991

LANDSCAPE MANAGEMENT

SERVING GOLF AND LANDSCAPE PRO ALS

PRICING FOR PROFIT



Plus:

PGRS

Financial survival

Guides:
- Fertilizer
- Pre-emergence weed control

I.P.M.

I've read greens almost all my life, and PennLinks reads like the top line on a leader board.

Reading greens has been part of my job since I was nine years old. I've learned that it's easier to read and play a 'quick' green than a slow one because you can cut the break in half. This PennLinks green looks as good and fast as any I've seen on the tour.

Right away I notice the good color, smooth texture and grainless, upright growth ... just like a carpet!

For quick, consistent greens that play as good as they look, I recommend PennLinks.

If you play on PennLinks and still can't putt good, I suggest you see your local golf pro!

Herman Mitchell

Herman Mitchell,
Renowned Caddy

PennLinks

One of the 'Penn Pals' from

Tee-2-Green Corp.

PO Box 250
Hubbard, OR 97302
1-503-981-9574
FAX 503-981-5626
1-800-547-0255

Circle No. 143 on Reader Inquiry Card

FEBRUARY 1991, VOLUME 30, NUMBER 2

LANDSCAPE MANAGEMENT®

On the cover: Landscape pricing must be free of guesswork. Don't base your success on the toss of a coin.

32 **COVER STORY: PRICING FOR PROFIT, AN INTRODUCTION**
by Travis Phillips, Ph.D. Are you charging the "right" price for landscaping services? In part one of this two-part, in-depth article, various practical approaches to pricing are examined.

38 **EARLY-SEASON FERTILIZATION**
by Anthony J. Koski, Ph.D. Depending on desired turf quality, and amount of spring and early summer athletic activity, many situations call for spring nitrogen fertilization.

46 **SURVIVING IN A TROUBLED ECONOMY, PART II**
by Rudd McGary, Ph.D. Survival in the 1990s will depend on how well you retain current customers, rather than how well you attract new ones.

51 **PRE-EMERGENCE WEED CONTROL IN WARM SEASON GRASSES**
W.M. Lewis, Ph.D. The degree and duration of herbicides effectiveness will vary according to the herbicide characteristics and seasonal weather conditions.

58 **PRE-EMERGENCE WEED CONTROL IN COOL SEASON GRASSES**
by Nick Christians, Ph.D. Annual weed control requires a sound knowledge of the grasses and weeds in question, and discriminating cultural practices.

64 **PGRs: LESS TIME, FEWER CLIPPINGS**
by Doug Oberman. Yard waste restrictions and busy mowing schedules persuade companies to add plant growth regulators to their arsenals.

68 **IPM: ON THE VERGE OF ACCEPTANCE?**
by Jack Simonds. Integrated pest management is gaining ground in some circles, as industry realizes IPM is not meant to "do away" with anything.

74 **MANAGE SALT, MANAGE STRESS**
by William Knoop, Ph.D. An understanding of the potential salt effect of various fertilizer materials can help the turf manager prevent fertilizer burn.

DEPARTMENTS

4 As I See It . . .
8 Green Industry News
11 News Briefs
26 Events
30 People
76 Quickie-Quiz
78 Research Update
80 Jobtalk
82 Products
90 Classified
94 Ad Index

LM Editorial Staff

Jerry Roche
Editor-in-Chief

Terry McIver
Mg. Editor

LM Editorial Advisory Board

Doug Chapman
Horticulturist
Dow Gardens
Midland, MI

J.R. Hall
Extension Agronomist
VPI & SU
Blacksburg, VA

Kent Kurtz
Professor
Horticulture
Cal Poly-Pomona

Harry Niemczyk
Professor
Ohio State University
Wooster, OH

A. Marty Petrovic
Assoc. Professor
Cornell University
Ithaca, NY

A.E. Dudeck
Professor
Univ. of Florida
Gainesville, FL

LANDSCAPE MANAGEMENT (ISSN 0894-1254) is published monthly by Edgell Communications, Inc. Corporate and Editorial offices: 7500 Old Oak Boulevard, Cleveland, Ohio 44130. Advertising Offices: 7500 Old Oak Boulevard, Cleveland, Ohio 44130, 233 North Michigan Avenue, 24th Floor, Chicago, Illinois 60601 and 3475 Lenox Road, N.E., Suite 665, Atlanta, Georgia 30326. Accounting, Advertising Production and Circulation offices: 1 East First Street, Duluth, Minnesota 55802. Subscription rates: $30 per year in the United States: $55 per year in Canada. All other countries: $100 per year. Single copies (pre-paid only): $3.00 in the U.S.; $6.00 in Canada; elsewhere $10; add $3.50 per order for shipping and handling. Back issues, if available, $10; add $3.50 per order for shipping and handling (pre-paid orders only). Office of publication: Edgell Communications, Inc., 1 East First Street, Duluth, Minnesota 55802. Second class postage paid at Duluth, Minnesota 55806 and additional mailing offices. Copyright © 1991 by Edgell Communications, Inc. All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher.
Canadian G.S.T. number: R-124213133.
POSTMASTER: Send address changes to LANDSCAPE MANAGEMENT, P.O. Box 6198, Duluth, Minnesota

BPA ABP

Get around

INTRODUCING THE NEW MID-SIZE

Mow more. Make more. It's just about that simple in the mow-for-hire business.

Power Steering

To help you save time on jobs—and load and transport time between them—John Deere has designed a new line of mid-size front mowers, the F700 Series.

Differential Lock

One notch below our F900s, these 17½- and 20-hp gas front runners are built to help you mow—and move—quickly.

A 48- or 54-inch deck makes them large enough to work "wide opens." Agile enough to bend and weave around trees, beds, sign posts and fences.

Weight Transfer

Because they're downsize, they're easier to double-up, too. Whether you're trailering crosstown or just

town fast

FRONT MOWERS FROM JOHN DEERE

SAFETY live with it

7-Gallon Fuel Tank

around the corner. Their overall width is 27 to 33 inches narrower than our full-size F935 with 72-inch deck. And they're nearly 24 inches shorter.

But the F700s won't short you on features. They're loaded like our F900s, with power steering,

2-Pedal Hydrostatic Control

2-pedal hydrostatic drive, diff lock, hydraulic lift and hydraulic weight transfer all standard.

Try one on for size at your John Deere dealer's or for more information call 1-800-544-2122.

JOHN DEERE

NOTHING RUNS LIKE A DEERE®

Circle No. 106 on Reader Inquiry Card

AS I SEE IT...

Plan for profit in new season

Your mission, landscape contractors, is to show a 10 percent net profit in 1991.

Is that an impossible mission?

A panel discussion at the Green Industry Expo in Nashville featured three of our best—Ron Kujawa, Bruce Wilson and Dave Minor— in a discussion of ways to insure, maintain and improve profit.

Do you know what is and is not profit? You might be mistaken.

Kujawa, owner of KEI Industries in Cudahy, Wisc., believes company owners confuse the amount of money they take in wages and benefits as part of profits. "That is compensation," says Kujawa. "Profit is that which is left after the cost of your goods are sold, after all overhead, wages and general administration."

Setting reasonable profit goals depends on your company's mix of business. "We set a goal for each of our five profit centers," says Minor, president of Minor's, Inc., Ft Worth, Texas. "We analyze where our best chances are at getting the best return." As an example of knowing when to cut bait, Minor says he is considering eliminating maintenance service, due to competition from small maintenance-only companies that can be very competitive cutters.

If you let costs fall where they may, you're headed for trouble.

The destructive power of unmonitored labor costs cannot be denied. Tracking labor activity is difficult, so much so that some managers might just decide that it's a waste of time; what it becomes is a waste of money.

Kujawa says KEI now tracks "indirect labor costs," which is a mix of all the little interruptions associated with jobs: stopping off for a part, downtime, deliveries. "It's so important," insists Kujawa, "to know just how accurate time sheets are."

Bidding must therefore reflect time spent on the job and a percentage of indirect labor.

Other tips for profits this season:

- Watch parts costs. Insist that you see the estimates for repairs.
- Bid accurately, and only buy what you put in the bid, for the bid price.
- Get out of markets in which you can't compete profitably.
- Put the whammy on overtime; it's a reward for inefficiency. Wilson did, and found that, "somehow, the work gets done."
- Give what profits you can to the people who helped make it happen, and keep some to finance growth.

At a time when people on the outside are trying to keep you from doing your job, it's imperative that you control what you can on the inside.

Best wishes for a happy and prosperous 1991!

Terry McIver

Terry McIver, managing editor

LM

EDITORIAL STAFF

Jerry Roche, Editor-in-Chief
Terry McIver, Managing Editor
Maureen Hrehocik, Group Editor

Office: 7500 Old Oak Blvd.
Cleveland, OH 44130
(216) 243-8100
FAX (216) 826-2832

MARKETING STAFF

Jon Miducki, Associate Publisher
Ann Langhenry, Midwest Sales Manager
Paul Garris, North Central Sales Manager
Bob Earley, Group Vice President

Office: 7500 Old Oak Blvd.
Cleveland, OH 44130
(216) 243-8100
FAX (216) 826-2832

Dick Gore, E. Coast Representative

Office: 3475 Lenox Rd. N.E.
Suite 665
Atlanta, GA 30326
(404) 233-1817
FAX (404) 261-7022

Robert Mierow, W. Coast Representative

Office: 1515 NW 51st Street
Seattle, WA 98107
(206) 783-0549
FAX (206) 784-5545

SUPPORT STAFF

Carol Peterson, Production Mgr.
Rosy Bradley, Sr. Production Mgr.
Ken McShane, Production Director
Dale Wilcox, Graphic Design
Marilyn Copp, Circulation Super.
Lynn Viele, Directory Coordinator
Gail Parenteau, Reader Service Mgr.

Office: 120 West Second St.
Duluth, MN 55802
(218) 723-9200
FAX (218) 723-9223

David Komitau, Graphics Coordinator

OFFICE: 7500 Old Oak Blvd.
Cleveland, OH 44130
(216) 243-8100

Richard B. Swank, Chairman; Richard Moeller, President; Lars Fladmark, Executive Vice President; Arland Hirman, Vice President/Treasurer; James A. Adler, Vice President; Joe Bilderbach, Vice President; David T. Mayer, Vice President.

Turf-Seed's CITATION II

contains naturally pest resistant endophyte

. . . a fungus that occurs within plant tissue between the cells.

New turf breeding discovery proves resistance to bill bugs, sod webworm, and other pests without harmful chemicals!

Left, insect damage in perennial ryegrass. Right, endophytic ryegrass resists insect pests.

CITATION II Turf-Type Perennial Ryegrass

is well known for its rapid establishment, fine texture, dark green color, improved mowability and drought tolerance, both in a monostand or as part of CBS II blend. But, the REAL plus is Citation II's high endophyte level (over 80%) that make it naturally resistant to leaf eating insects.

This plus results in savings . . . in chemical costs to maintenance people and less exposure to insecticides for applicators, homeowners, golfers and picnickers.

Citation II is not only an investment in finer turf, but it's a savings account for turf managers . . . and our delicate planet.

PVP 8400142. Unauthorized propagation prohibited.

Black lines are endophyte mycelium in leaf tissue.

Magnified endophyte in seed.

Qualified turf grass associations can earn cash for turf research by saving Citation II Oregon certified blue tags. Call us or write for details.

Produced and marketed by:

Turf-Seed, Inc.®

PO Box 250, Hubbard, OR 97032
Outside Oregon 1-800-247-6910
503-981-9571 TWX 510-590-0957
FAX 503-981-5626

Circle No. 145 on Reader Inquiry Card

A BAYLETON AND DYRENE ALSO TURN YOUR

Treat your fairways with BAYLETON and DYRENE. It keeps your customers from tracking disease up on your tees and greens. More importantly, it raises the overall quality of your course.

For summer patch, nobody beats Mobay. BAYLETON provides superb control. And, Mobay can give you the information and practices to help keep this disease from coming back.

SUMMER PATCH

DOLLAR SPOT

LEAF SPOT

BAYLETON has an unequalled reputation for stopping dollar spot. And, it controls anthracnose and other major turf diseases.

Nothing works better on leaf spot than DYRENE. Of course it also controls a broad spectrum of diseases including brown patch.

BAYLETON gives you broad-spectrum control on a wide variety of ornamental plants.

BAYLETON is a Reg. TM of Bayer AG, Germany. DYRENE is a Reg. TM of Mobay Corporation.

©1991 Mobay Corporation

FUNGICIDE PROGRAM WILL COLLEAGUES GREEN.

BAYLETON is a powerful systemic. DYRENE is the only contact fungicide with its type of chemistry. Apply both as a program during the summer months.

Envy. You can see it in their eyes as they look at your tees, greens, and fairways. They may even start comparing. But deep down, you know they can't touch your course.

This kind of satisfaction starts with BAYLETON® 25 Turf and Ornamental Fungicide and DYRENE® 4 Turf Fungicide. Both have a long history of unparalleled performance.

Team them up for your premium fungicide program. They'll keep your course and colleagues turning green.

For more information contact your Mobay representative or Mobay Corporation, Specialty Products Group, Box 4913, Kansas City, MO 64120. (800) 842-8020.

Mobay
A Bayer USA INC COMPANY

Circle No. 123 on Reader Inquiry Card

911461

GREEN INDUSTRY NEWS

FEBRUARY 1991, VOLUME 30, NUMBER 2

LANDSCAPE MANAGEMENT

LAWN CARE

LCOs believe legislation will be obstacle in future

MARIETTA, Ga. — While public environmental concern is viewed as an "obstacle" to future growth, lawn care professionals believe more applicator certification and regulation will help emphasize the industry's environmental responsibility.

Slightly more than half of 342 respondents to a Professional Lawn Care Association of America poll said environmental concerns have cast a negative shadow on business. Nine in 10 indicated they believe it will be an obstacle in the future.

However, past PLCAA president Richard Steinau of Greenlon Inc. in Cincinnati, believes environmental awareness also could help business if communicated correctly.

"As people become more conscious of the environment, we expect they will better understand and appreciate the expertise of professional certified applicators," Steinau says. "This may open up new markets for skilled professionals."

In response to increased environmental sensitivity, lawn care applicators noted in the survey that they now conduct more employee and customer education programs, maintain better records and strictly comply with product label instructions.

Nevertheless, members expect environmental concerns to stimulate regulatory changes, even though 64 percent believe the only action needed is enforcement of laws already in the books. One in four thinks no regulatory changes are necessary. (See chart for their expectations for regulatory change.)

In the poll, which was sponsored by Sandoz Crop Protection Corp., PLCAA members indicated they feel product manufacturers should take the leadership role on environmental questions; nearly half (44 percent) said manufacturers have adequately responded. Specifically, they said manufacturers should provide more education and training programs (94 percent), and more printed materials on product safety and efficacy (96 percent) for distribution by applicators.

The poll was taken at the first Green Expo in Nashville, Tenn. last November. □

BASE: 342 **SOURCE:** Sandoz Crop Protection Co.

ENVIRONMENT

'Grasscycling' coming in April

MARIETTA, Ga. — National Grasscycling Week will be held April 21-27 as part of National Lawn Care Month.

The event, sponsored by the Professional Lawn Care Association of America (PLCAA), promotes disposal methods for grass clippings and other yard debris as a way to combat dwindling landfill space.

The PLCAA anticipates

lawn care companies, manufacturers, retailers, university extensions services and associations offering community events and educational programs to increase public awareness.

In marking the special week, the association offers these grasscycling tips:

- Keep mower blades sharp.
- Mow at proper intervals so no more than one-third of lawn height is trimmed at each cutting.
- Maintain proper water and fertilization levels. □

RESEARCH

Thatch, weed cure: longhorns on lawn?

AUSTIN, Tex. — Eleven Texas longhorns have taken up residence at the National Wildflower Research Center to help researchers find the best method of restoring native prairie land. The cattle, which arrived last November, will be used at first to reduce the amount of thatch in the center's 15 vegetated acres, as well as to control bermudagrass.

"There is a major push to restore and maintain prairie land," says Alison Hill, Wildlife Center community ecologist. "Cattle have been a natural part of the tallgrass prairie in Texas. This long-term study is to discover the best way to rehabilitate the land from a monoculture to a greater diversity of plant species."

Wildflower Center researchers will study the effects of grazing as a tool to control exotic grasses so native prairie grass species can be re-introduced and encouraged to grow.

In a non-related study, the research center has developed soil fungi experiments aimed at more successfully re-establishing nursery-grown native plants into landscapes.

Center personnel have found that plant seedlings grown in the soilless medium often used by nurseries grow better and don't require as much fertilizer when inoculated with mycorrhizae, fungi that help them absorb more nutrients and water. Once some plants have been inoculated, they remain so, benefitting from the fungi throughout their lives and requiring less water and fertilizer. The fungi are also re-introduced into the soil, where other plants may benefit from them. □

NEWS BRIEFS

THE SUBJECT WAS BENTGRASS...at the recent Wisconsin Golf Turf Symposium in Milwaukee. **Dr. Joe Duich** advised seed buyers to make careful note of seed lot numbers and retain all records "to insure they get what they pay for." **Kevin Dushane**, superintendent at the Bloomfield Hills Country Club in Union Lake, Mich., said that, "golfers—principally lower handicap players—would like to have a fairway lie where the ball sits up on the turf. Mowing at 1/2-inch with a good stand of bentgrass can deliver that playing condition."

FLOWER GUIDE...A full-color 28-page booklet designed for the golf/landscape professional is being offered by the Professional Plant Growers Association. It contains valuable information on planning, planting and maintaining flowering annuals:

- a herbicide tolerance chart;
- a list of 63 popular flowering annuals with photos; and
- a chart describing each plant with regard to spacing, ease of maintenance, height, light, moisture and temperature requirements, degree of hardiness.

To order, send $2 to: PPGA, P.O. Box 27517, Lansing, MI 48909.

IN THE WORKS... An "Envirotron" is in the works at the University of Florida in Gainesville. The structure, already approved by the Florida Turfgrass Research Foundation Board of Directors, is a field laboratory with components for rootzone, greenhouse and other controlled environment features. The complete Envirotron will consist of 3,172 sq. ft. of phytotron, head, house, storage, wet laboratory, rhizotron with automatic retractable rain shelter, and living quarters. Funding for the $700,000 project is expected to be completed by April 1.

THE FUTURE IN VIDEO..."Growing Futures," a career video, is soon to be released by the Green Industry Council of Sutton, Mass. Careers in landscape architecture, design and construction; interior landscaping; turf management; arboriculture; and nursery and greenhouse management are among those highlighted in the 18-minute video. "There is definitely a positive future," says **Byron Gechtel** in the video. To order the videotape, send $49.95 to: Green Industry Council, P.O. Box 171, Sutton, MA 01590 or call Phyllis Gillespie at (508) 476-3007. Along with the tape, you get a color poster and booklet on career opportunities and educational programs.

LAWN CARE

May take 3 years to integrate TruGreen and ServiceMaster

MIAMI BEACH, Fla. — Integrating Waste Management lawn care divisions into ServiceMaster operations could take up to three years, ServiceMaster president Carlos Cantu told members of the National Pest Control Association at its convention here late last year.

The decision came after ServiceMaster completed a deal last year acquiring the pest control and lawn care portions of Waste Management, said to be among the biggest transactions in both industries. ServiceMaster will be adding 270,000 of Waste Management's TruGreen lawn care customers through the deal.

"There is a lot of brand awareness in the marketplace for Waste Management, and for the names of the companies before Waste Management acquired them," Cantu said during a press conference.

"The last thing we want to do is detract from that awareness, so we want to do it in such a way as to retain the names," he said, adding the Terminix pest control division could assume the Terminix name systemwide "in a subtle fashion."

TruGreen's 70 nationwide locations will continue as company branch operations while ServiceMaster's 165 lawn care franchises will operate under franchise arrangements as before, Cantu says.

"At this point, we don't anticipate any changes. The TruGreen (outlets) will continue as company-owned operations," says Cantu, while TruGreen branches will receive support from ServiceMaster franchises. Acquisition of Waste Management's lawn care service is expected to net more than $80 million in customer-level revenues while the pest control portion of Waste Management, also being folded into ServiceMaster operations, could add another $90 million.

All ServiceMaster home and commercial services including lawn care, pest control and maid and cleaning services, also under franchise arrangements, may be reached through the central (800) 937-3783 network telephone number. □

World Dealer

LINCOLNSHIRE, England — Gannon U.K. Ltd. was winner of Glenmac's World Dealer Award for 1990 for sales of the Harley Power Rake, used in golf, athletic fields, and landscaping. Photo shows, left to right: Guy Overton, Richard Overton and Derek Overton of Gannon accepting from Mac McPherson, president of Glenmac, Jamestown, N.D.

Chipco® 26019. For turf that thrives

RHÔNE-POULENC © 1990 Rhone-Poulenc Ag Company, 2 T.W. Alexander Drive, Research Triangle Park, NC 27709. For additional information, please call: 1-800-334-9745. As with any crop protection chemica

GOLF

Don't gamble a 'super' job for green speed

NOVI, Mich. — Getting the maximum ball speed from a putting green doesn't mean golf course superintendents have to run the risk of damaging the turf and losing their jobs.

Jacobsen product manager Bill Kinzer says that using a greens conditioning machine can provide good green speed and healthy turf without jeopardizing the super's livelihood.

"When superintendents were rolling the greens, drying them out, double-cutting, topdressing frequently, reducing nitrogen and dropping the height of cut below ⅛ of an inch to increase ball speed, they were literally putting their jobs on the line," says Kinzer. "Now you can reduce or eliminate a lot of those practices by going with a greens conditioner."

Kinzer notes that, in addition to reducing the frequency of these potentially

Jake's Bill Kinzer

stressful turf practices, one of the main advantages of greens conditioners like Jacobsen's Turf Groomer is that they allow superintendents to go to a higher cut.

"I know a number of superintendents who are cutting at 3/16 of an inch and have a good root system and the same ball speed they had when they were cutting below ⅛ of an inch," Kinzer says. "Four or five years ago, everyone wanted to see how short they could mow their greens. The premise was: the shorter the grass, the faster the green. Everybody wanted the thinnest bedknife possible on their greens mowers so they could get the lowest cut possible on their greens.

"Some supers lost their jobs over it, because when spring came around, there was no grass left on the green."

Kinzer says that the higher cut and the resulting increase in the amount of leaf surface on the plant means a healthier grass plant with deeper roots, and makes the turf more resistant to certain diseases.

Along with improving the turf, Kinzer says greens conditioners improve the putting surface by eliminating or reducing a number of undesirable aspects of plant growth.

"Number one, the grain is removed from the grass," he says. "That's what slows the ball down. You get a smoother surface. And number two, it helps control thatch, to a degree." □

LANDSCAPING

Newman pledges high standards

SACRAMENTO, Calif. — Lebo Newman, new president of the California Landscape Contractors Association, has formed an Environmental Committee to explore ways the landscaping industry can be gentler on the environment.

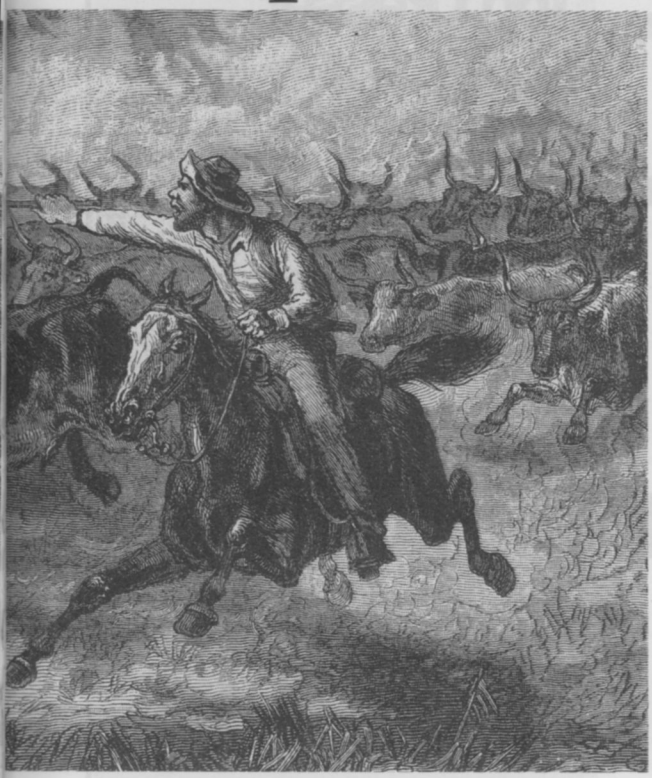
"We can educate people on better ways to apply (control products) or better ways to do our work without being a detriment," says Newman, who adds that the industry needs more ongoing management practices to prevent excessive application.

Newman, president of Redwood Landscaping in Santa Rosa, has been an active CLCA member since 1974.

"With passion, I pledge to maintaing CLCA's goals and to improve the image of the landscape industry,"

continued on page 14

under pressure.



Your high-value turf will never need to withstand the punishment of a cattle drive, but there's another kind of pressure your turfgrasses are facing right now: increased traffic. And it can make even the hardiest varieties more vulnerable to disease damage.

That's why more turf pros rely on CHIPCO® brand 26019 fungicide than any other disease control.

Even turf-killer diseases like Helminthosporium Leaf Spot and Melting Out, Dollar Spot, Brown Patch, Fusarium Blight, Red Thread, Pink and Gray Snow Mold and Fusarium Patch knuckle under to the power of CHIPCO® brand 26019.

And the long-lasting protection of CHIPCO® 26019 makes it the perfect foundation for a season-long disease management program. Just one application protects turf for up to four full weeks.

This year, invest in the best: CHIPCO® brand 26019 fungicide.

Chipco® 26019
Fungicide

always read and follow instructions on the label. CHIPCO is a registered trademark of Rhone-Poulenc.

Circle No. 133 on Reader Inquiry Card

CLCA's Lebo Newman

NEWMAN *from page 13*

Newman says. "We face challenging times: recession, drought, new regulations on employees, clean air, chemical use. I intend to position CLCA at the forefront of these issues."

Newman wants to see more industry support of bio control research.

"I think we can be forerunners in assisting the colleges with looking into additional use of microbes and natural biotics to help promote natural activities in the soil," says Newman.

Chairman of CLCA's environmental committee is Francisco Peccorini of Landscape Management Services, San Rafael. □

New control products

'Barricade,' 'Sentinel' introduced by Sandoz

CHICAGO — Sandoz Crop Protection expects to introduce two new turf products in 1991, Barricade preemergence herbicide and Sentinel fungicide.

Both products have undergone extensive testing in the field.

"All in all, I had better results with Barricade than with my normal treatment program," says Tom Dale of Radnor Country Club, Philadelphia. Dale claimed longer residual control of goosegrass in his bent/poa fairways.

Other golf course superintendents satisfied with Barricade:

- Ben Stagg (ryegrass fairways at Hog Neck Golf Course, Easton, Md.)
- Mike McNulty (ryegrass fairways, Ashborne Country Club, Cheltenham, Pa.)
- Fred Meda (bermudagrass fairways at Myrtle Beach (S.C.) National Golf Club)

"Barricade is the first herbicide that I'm award of that lengthens the maximum residual control of the major problem grasses (crabgrass, goosegrass) up to a 12-month season," says Meda.

Sentinel is a new systemic fungicide that controls a broad spectrum of major turf diseases including dollar spot and brown patch. Meda, who tested it, claims it is "the product of the future" and Stagg, who used it on rye fairways and bent greens and tees, says he was "very impressed."

Sentinel has growth regulating properties that include turning the turf a darker green and thickening it, tests prove.

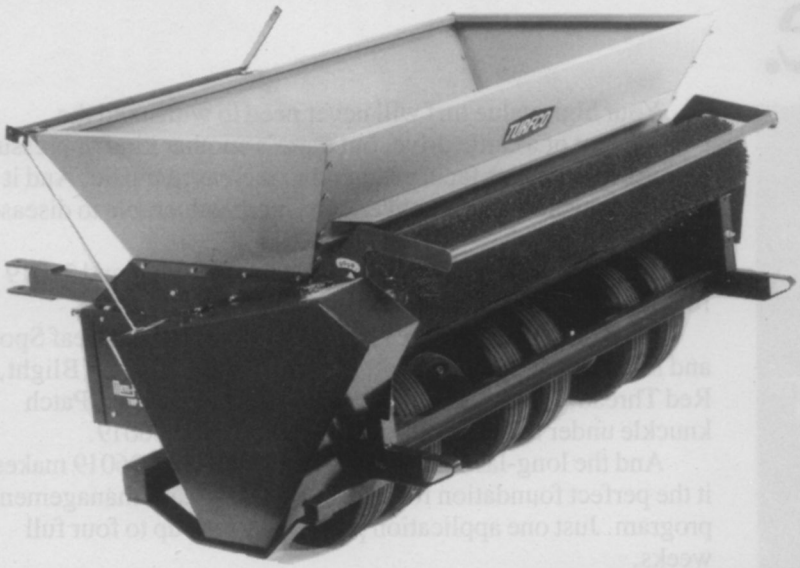
For more information on either product, contact Howard Heffron at Sandoz: (708) 390-3750. □

Hoechst-Roussel's 'Ignite,' 'Illoxan' due in '92

SOMERVILLE, N.J. — Hoechst-Roussel Agri-Vet Co. has announced the development of two control products designed for the golf and landscape markets. They should be ready for the 1992 growing season.

Ignite herbicide, which currently boasts an EPA Experimental Use Permit, is expected to get full registration later this year. The product is a non-selective

continued on page 18



Pioneers of top dressers since 1961 **TURFCO**

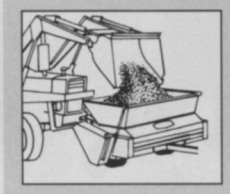
Self-propelled, truckster mounted, and 5th wheel hitch models also available.

Call for free demonstration or videotape.
Turfco Mfg. Inc., 1655 101st Ave. NE, Minneapolis, MN 55434
Phone (612) 785-1000 Fax (612) 785-0556

The *TOP* Top Dresser Mete-R-Matic III

95% Customer Satisfaction

Course superintendents know who's the best. Surveys show they choose Turfco's Tow-Type Top Dresser for superior performance. The new Mete-R-Matic III Tow-Type lowers PSI by one-third with its unique ground-driven design. It's the best Turfco top dresser yet!

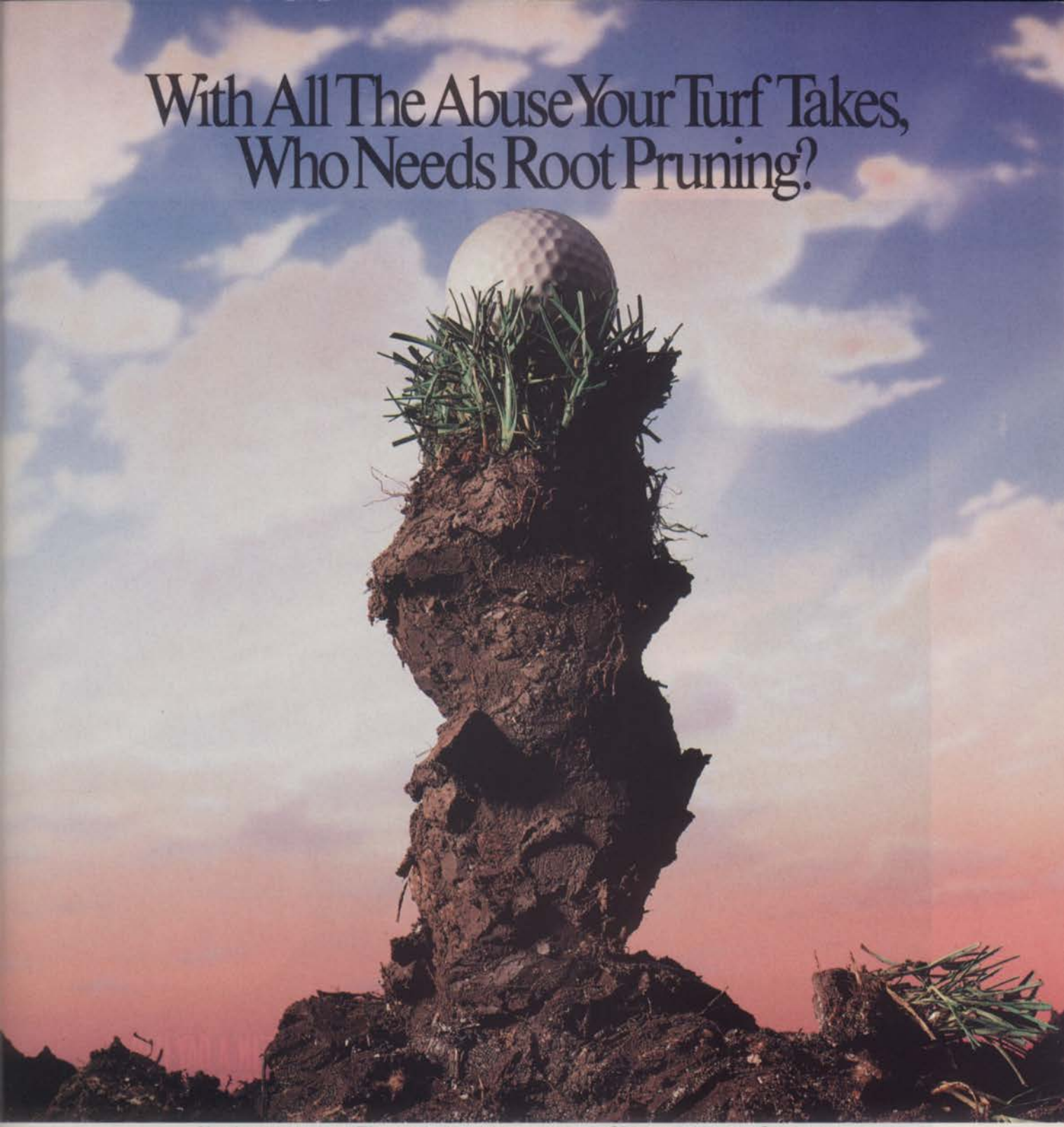


- **Huge 22.5 cu. ft. capacity**
- **New 6-wheel design lowers PSI**
- **Distributes evenly**
- **Ground driven, no engine, no hydraulics**

When you want the best . . . get a *TURFCO*

Circle No. 147 on Reader Inquiry Card

With All The Abuse Your Turf Takes, Who Needs Root Pruning?



You know the story. The guys who swing an iron the way a lumberjack wields an ax are the same guys who yell the loudest when weeds give them a bad lie. So, with all the abuse your turf takes, the last thing you need is root-pruning from your herbicide. That's why you need CHIPCO® RONSTAR® brand G herbicide. University root pull studies show that CHIPCO® RONSTAR® G works without pruning turf roots. That means healthier roots and stronger, more durable turf. Best of all, just one pre-emergence application provides season-long control of 25 tough broadleaf and grassy weeds —including goosegrass, crabgrass and Poa Annua.

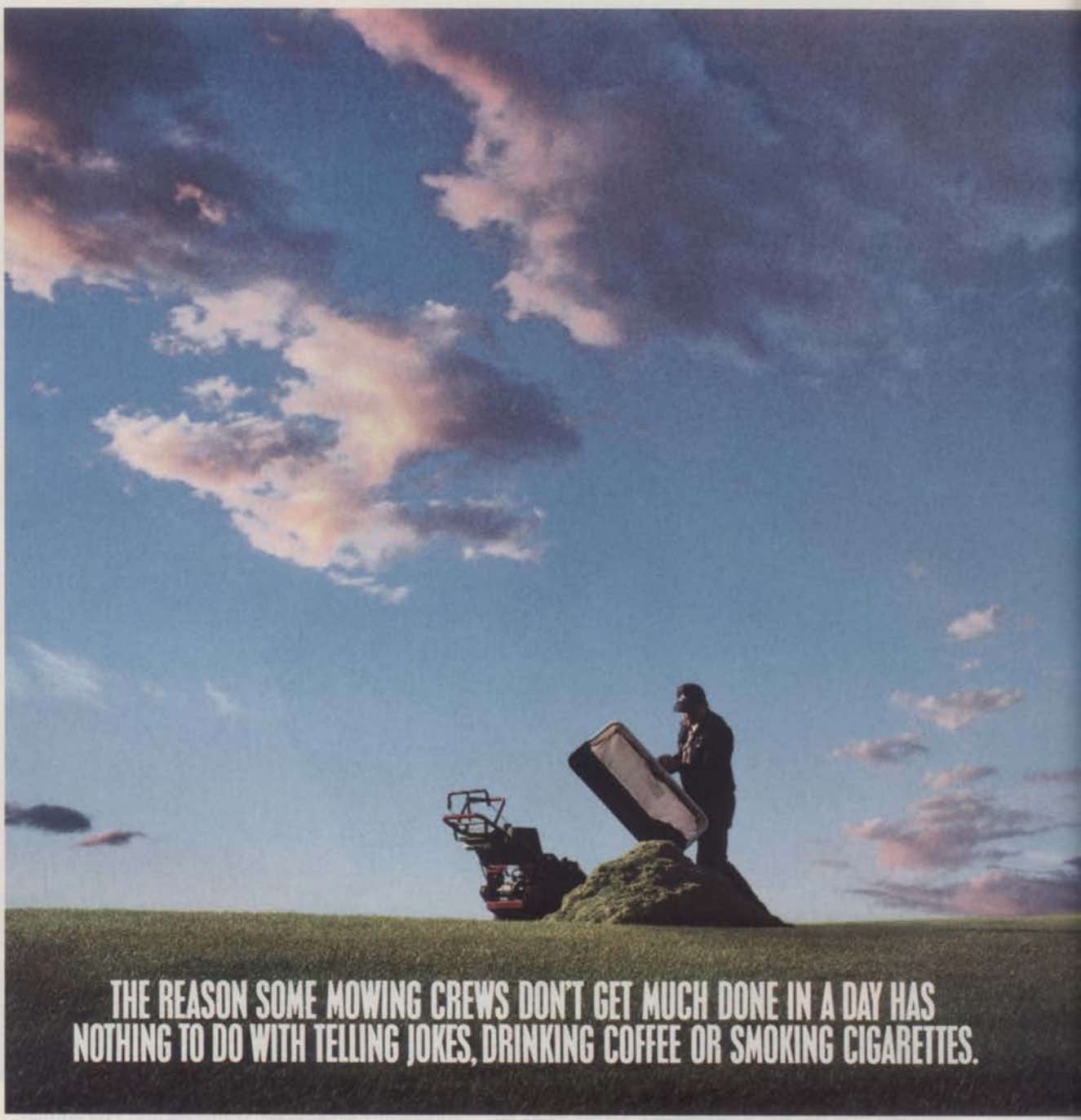
You'll also appreciate the fact that CHIPCO® RONSTAR® G won't leach out or move laterally through the soil and is labeled for use on a wide variety of ornamentals, so you can keep more of your course weed-free with each application. CHIPCO® RONSTAR® brand G herbicide. It can't improve the quality of play on your course, just the quality of weed control.

Chipco® Ronstar® G
Brand Herbicide

RHÔNE-POULENC

Rhone-Poulenc Ag Company, 2 T.W. Alexander Drive, Research Triangle Park, NC 27709. For additional information, please call: 1-800-334-9745. As with any crop protection chemical, always read and follow instructions on the label. CHIPCO and RONSTAR are registered trademarks of Rhone-Poulenc. © 1990 Rhone-Poulenc Ag Company.

Circle No. 135 on Reader Inquiry Card


THE REASON SOME MOWING CREWS DON'T GET MUCH DONE IN A DAY HAS
NOTHING TO DO WITH TELLING JOKES, DRINKING COFFEE OR SMOKING CIGARETTES.

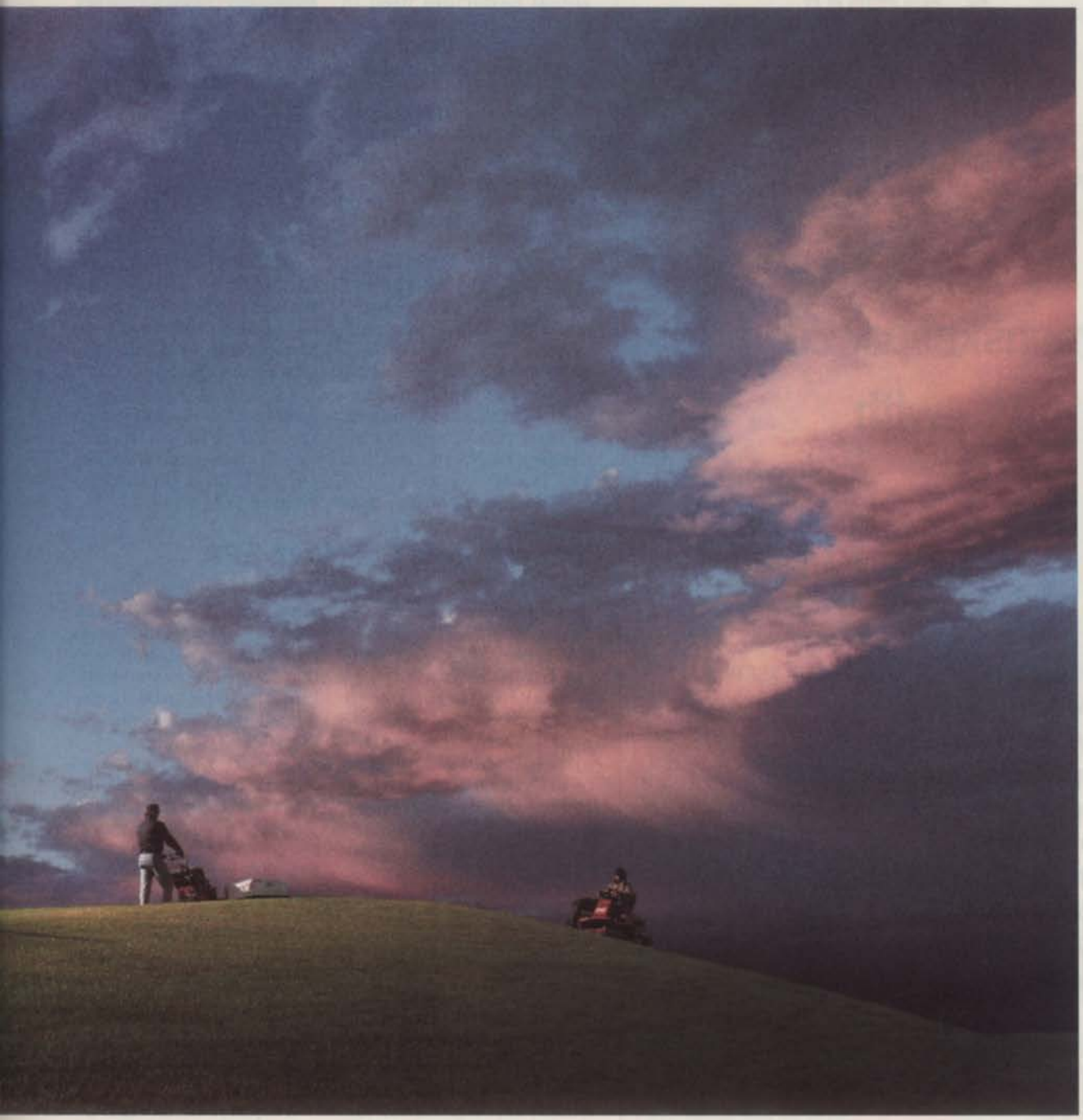
When you use ordinary bagging mowers, up to 38% of your employees' time is spent handling grass clippings.

The way we see it, that's just time going to waste.

Because with the new 48" Toro Recycler™ cutting deck, you don't have to bag at all. Yet you'll still be giving your customers the kind of clean, well-groomed lawn you'd be proud to stake your reputation on.

The new 48" Toro Recycler deck.

Instead of bagging clippings, the Recycler deck cuts and re-cuts them into fine slivers. Then its tested airflow design



injects them below the surface of the grass. No other mower has this unique vertical discharge system. And, since it returns clippings back to the lawn, you won't have the hassle of taking care of clippings disposal.

The 48" Recycler deck is available on a variety of Toro commercial mowers. And our Recycler technology is available throughout our mower line. So stop into your Toro ProLine dealer and ask how the Recycler deck can make your operation more productive.

And, as long as you're there, have a cup of coffee.

TORO ProLine
The Professionals that keep you cutting

Circle No. 146 on Reader Inquiry Card

A NEW WINNING COMBINATION.

Greenskeeper 20-4-10 with TEAM™

Get a jump on crabgrass and give turf a great start this spring with new Greenskeeper 20-4-10 Homogeneous Fertilizer with TEAM 1.15%. This two-in-one product contains 4.8 units WIN (40% Organic), providing predictable slow release nitrogen. Plus it's formulated with a premium crabgrass preventer to fight tough annual weeds. For dependable, reliable fertilization and crabgrass control, make your choice Greenskeeper 20-4-10 with TEAM. From your source for premium quality turf products.

Lebanon TURF PRODUCTS
A division of Lebanon Chemical Corporation

800-233-0628

TEAM™ is the Registered Trademark of DowElanco's combination of benefin and trifluralin.

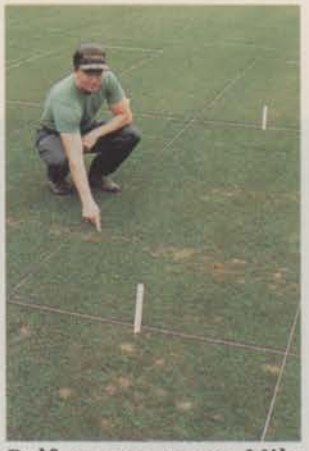
Circle No. 117 on Reader Inquiry Card

herbicide for use in orchards, vineyards and industrial areas. It can be tank-mixed with most residual herbicides used in non-crop areas. It will also be registered for use on grapes, palm fruits and tree nuts.

"Ignite has applications across the green industry where you don't have to worry about herbicide movement off-site," says Dr. Phil Robinson, product manager.

Illoxan herbicide, which has a 24C label in Florida, Georgia, Alabama and South Carolina, is expected to be registered some time in 1992. It is for control of goosegrass in bermudagrass turf—which is to say on golf courses. A 24C label is also pending in North Carolina and Texas.

"Illoxan will make a major impact in the golf industry," Robinson notes. "We'll change the way people apply grass control herbicides." □



Golf course super Mike McNulty observes disease on the 15th fairway at Ashborne Country Club. (See article on page 14.)

'Impact' gets EUP from EPA

RALEIGH, N.C. — An experimental use permit has been granted by the EPA to BASF Agricultural Chemical Group for an experimental turf herbicide to control broadleaf and annual grasses. The one-application herbicide will receive trials on more than 260 acres at sites across the country.

A full registration application is on file with the EPA for Impact, the herbicide which received testing last year on its control capabilities for crabgrass, dandelions, clover and other weed species.

BASF specialty business manager Terry Hanson says that, after six years study, Impact will be tested under typical conditions and applications.

The firm also wants to determine the tolerant grass varieties for Impact. To date, bluegrass, ryegrass, tall fescue and bermudagrass have proved tolerant.

The product is formulated as a water soluble powder. □

'Snapshot' for ornamentals

INDIANAPOLIS, Ind. — Snapshot herbicide from DowElanco has received federal EPA registration for use on ornamental plants, groundcovers, non-fruit- and nut-bearing crops, non-bearing vineyards and nursery stock.

Snapshot 80 DF (dry flowable) provides up to eight months control of 86 broadleaf and grassy weeds before they emerge. It can be applied directly over the top of established ornamentals and/or to wet foliage. 174 labeled species of ornamentals have excellent tolerance to it.

Snapshot 80 DF can be used alone or tank-mixed with other herbicides. Because it is a pre-emergent, applications should be made in the spring or fall before weeds emerge, preferably one to two weeks before weed germination For best results, the herbicide must be activated by at least ½-inch of moisture within 21 days of application. □

OUR REPUTATION PRECEDES US.

1986: #1 IN TRUCK CUSTOMER SATISFACTION
1987: #1 IN TRUCK CUSTOMER SATISFACTION
1988: #1 IN TRUCK CUSTOMER SATISFACTION
1989: MOST TROUBLE-FREE TRUCK LINE IN AMERICA
1990: #1 IN TRUCK CUSTOMER SATISFACTION
1990: MOST TROUBLE-FREE TRUCK LINE IN AMERICA

We've always believed that if we made good trucks, word would get around. And that's what's happening, if our rankings in recent J.D. Power and Associates surveys are any indication. This year, for the fourth time in the last five, our entire line of trucks ranked number one in customer satisfaction.*

And Mazda received the award for most trouble-free compact truck line in America for the second straight year.** We think that's a pretty good indication of what you, as a fleet operator, can expect from Mazda.

Choose from a complete range of models, 2- and 4-wheel drive, and a choice of engines to suit any purpose. All with standard features like confidence-inspiring rear anti-lock brakes. And all backed by our 36-month/50,000 mile, no-deductible, "bumper-to-bumper" warranty–one of the best basic warranties† in the truck business.

To get the lowdown on the complete line of tough, reliable Mazda trucks, call our National Fleet Sales office at (714) 727-6453. As you'll quickly see, your business can benefit from choosing Mazda. Because only our reputation precedes us.

*J.D. Power and Associates 1986, 1987, 1988, 1990 Light Duty Truck Customer Satisfaction with Product Quality and Dealer Service.℠ **J.D. Power and Associates 1989 and 1990 Compact Truck Initial Quality Survey.℠ Based on owner reported problems during the first 90 days of ownership. †Contact the National Fleet Sales Office for limited-warranty details.

mazda
IT JUST FEELS RIGHT.®

© 1990 Mazda Motor of America, Inc.

Circle No. 121 on Reader Inquiry Card

Weed Control in the Environmental Age:

As turf management has become more sophisticated and environmentally significant, it has become absolutely essential for turf professionals to select a post-emergent herbicide that: • Has a broad enough spectrum to control virtually *all* problem weeds • Releases a minimum of active ingredients into the environment • Provides maximum safety to turf and adjacent trees and ornamentals • Reduces overall expenses (chemical *and* labor) to an absolute minimum. Read why only Trimec® Turf Herbicides can help you solve all of these problems.

Of course you know that herbicidal activity is influenced by temperature, weed species, state of growth, and type of turfgrass. So a herbicide that would be effective in taking hardened-off spurge out of bluegrass would be totally out of place for treating dollarweed in bermudagrass.

Indeed, in light of today's complex weed control problems, the one-size-fits-all approach to herbicide selection has become totally obsolete.

As a matter of fact, in order to maximize the efficiency of weed control throughout the U.S.A., we have developed seven different Trimec Turf Herbicide formulations.

But even more important, we have developed a unique manufacturing process for each of these seven formulations so that the acid components are reacted together to form a *Complex* of unified salt, thus assuring you that every Trimec Complex will always be dependable, time after time.

For a comprehensive explanation of how a Complex differs from a formulator tank mix — and why this difference is vital to you in coping with weed control problems today — we invite you to take a close look at the schematic diagrams on the opposite page, which were drawn up for us by one of the most prestigious university professors ever involved in ornamental turf.

Start the year right and early — with Trimec

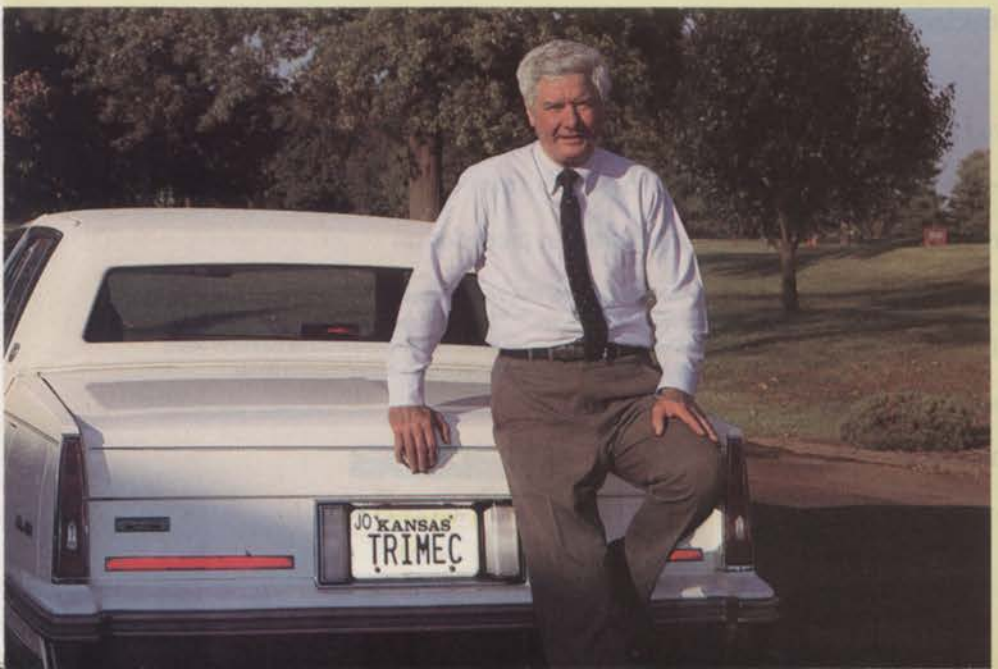
Start early in the season with a broadcast treatment of Super Trimec any time when the temperature is above 40 degrees . . . even in weather with intermittent rain or snow.

This not only enables you to get those over-wintering annuals at a time when you might otherwise have a void in your work schedule, but it also enables you to get them before their roots have a chance to compete with the turfgrass you are trying to thicken up . . . and you get *all* the broadleaves because Super Trimec has the broadest spectrum of any post-emergent broadleaf herbicide.

Immaculate turf is more than cosmetic

. . . it is also friendly to the environment. It aids in the prevention of runoff, thus improving soil moisture retention; it helps to offset urban heat generated by pavement and buildings; it helps recycle auto emissions into oxygen; it makes everybody feel better. I'm proud of the role Trimec plays in promoting weed-free turf.

Everett Mealman, President
PBI/Gordon Corporation



Increase your efficiency by selecting the right Trimec Complex for your specific weed control problems.

☐ **Super Trimec:** Unparalleled broadleaf control for cool-weather broadcasting and spot treatment of hardened-off summer annuals such as spurge, oxalis and ground ivy. One gallon covers 4 acres.

☐ **Trimec Classic:** Unmatched efficiency for controlling broadleaves when they are actively growing. One gallon covers 2½ acres.

☐ **Trimec Plus:** The ultimate post-emergent herbicide. Outstanding control of crabgrass and nutsedge, plus all the broadleaves controlled by Classic Trimec.

☐ **Trimec Southern:** Especially designed to control broadleaves in 2,4-D-sensitive southern grasses.

☐ **Trimec 992:** The applicator's formula. Especially designed for tank mixing with liquid fertilizer and other multiple tank-mix combinations.

☐ **Trimec Encore:** A Trimec Complex that contains no 2,4-D.

☐ **Trimec Bentgrass Formula:** Especially designed for use on bentgrass.

No matter how tough your weed problems, you can depend on a Trimec Complex for a specific solution.

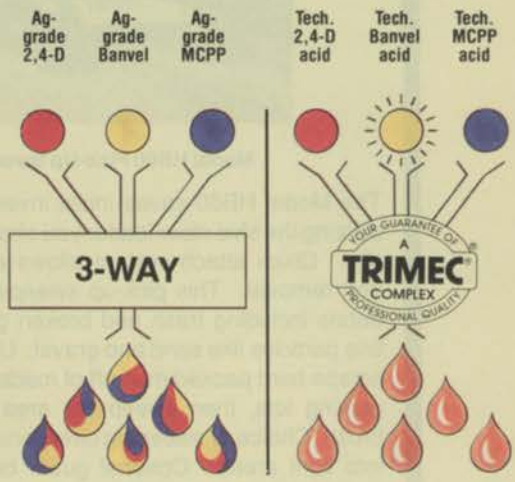
Furthermore, Super Trimec is not only extremely economical in terms of cost per acre, but it is also very friendly to the environment in that one gallon covers four acres.

If, however, you are unable to apply your first broadcast until later in the season — when the temperature is up around 75° and the weeds are actively growing — don't fret about the lost time. Simply apply the one-and-only original Classic Trimec. You'll get the same excellent weed control, and your cost per acre will be slightly less (which will help you justify not getting out earlier with Super Trimec).

Depending on the season and the condition of your turf, you may or may not need another application of Classic to treat summer annuals.

If crabgrass, goosegrass or dallisgrass become a problem, even in spite of your pre-emerge precaution, don't worry. Trimec Plus will take them out — usually with one application — without discoloring your Kentucky bluegrass or bermuda grass. And, of course, Trimec Plus will also control any broadleaves that are present.

Certainly Trimec Plus is the ultimate post-emergent herbicide . . . we have never introduced a new product that has met with such universal approval.



Color code: Red, 2,4-D; Yellow, Banvel; Blue, MCPP; Amber, Complex acid. Note: Colors are for code only and do not in any way indicate the color of the product they are intended to identify.

Why only a Complex is right for weed control in ornamental turf:

Historically, the chemicals used to control weeds in ornamental turf were developed for use in agriculture, where 80% weed control is considered acceptable.

And while Trimec was specifically developed for ornamental turf, it was originally formulated by tank-mixing ag-grade 2,4-D; ag-grade MCPP; and ag-grade Banvel® (dicamba).

Although the original Trimec immediately and dramatically improved weed control over that of any other herbicide, the tank-mixing procedure of ag-grade chemicals resulted in minute inconsistencies in the chemical composition of individual droplets, with consequent inconsistencies in weed control.

To eliminate these inconsistencies, we developed a technique of reacting the acid components of Trimec together to form a unified salt Complex in which every droplet of every production run would always be an exact mirror image of the total.

The manufacturing process involved in making a Trimec Complex is a trade secret, but the basic building block is known to all chemists. It is technical dicamba (the active ingredient of Banvel) that triggers the synergistic activity and makes it chemically possible to react the acids into a Complex.

Of course, it is this same Banvel synergism that enables Trimec Complexes to be so effective with such a small amount of active ingredients . . . which in turn contributes to Trimec's unparalleled safety record, as demonstrated by the fact that more than 30 million acres of turfgrass have been treated with Trimec, and there has never been an instance in which damage to trees and ornamentals was proven to be the result of root absorption traced to Trimec when applied according to label directions.

Technical Banvel acid is the key! And since PBI/Gordon has the exclusive turf use of technical Banvel acid in North America, only PBI/Gordon can make Trimec.

Do you have a weed problem?

One of our weed control specialists will gladly help you. Call toll-free, tell us your problems. No obligation. Ask for Sales Service.

1-800-821-7925

Schematic drawings show the differences between a tank-mix and a Complex

These drawings indicate that, in a formulator's tank-mix (left), the molecules of 2,4-D, MCPP, and dicamba do not combine to form a new molecule. Accordingly, each droplet will contain its own unique amount of one or more of the ag chemicals, and control may vary from droplet to droplet.

In a Complex (right), the three acids are reacted together to form a salt Complex. When this is formulated with the other important ingredients, wetting agents, dispersants and sequestrants, as well as with continuous analytical monitoring that includes the use of a high-pressure liquid chromatograph, the unique product that is Trimec becomes a reality. Every droplet is an exact mirror image of the total, and thus precisely optimizes the intended synergistic activity.

The differences between a tank-mix and a Complex become major when the goal is cosmetic excellence.

Banvel® is a registered trademark of Sandoz.
Trimec® is a registered trademark of PBI/Gordon.
© 1991, PBI/Gordon Corporation.

pbi/gordon corporation

1217 WEST 12th STREET
P.O. BOX 4090
KANSAS CITY, MISSOURI 64101

TRIMEC®

Circle No. 129 on Reader Inquiry Card

BROADLEAF HERBICIDE

742-191

Inexpensive Site Clean-Up

Model HB60 Pick-Up Sweeper

The Model HB60 saves initial investment costs by utilizing the skid steer loader you already have on the site. Quick attach system allows easy installation and removal. This pick-up sweeper collects bulky debris including trash and broken glass as well as fine particles like sand and gravel. Use the bucket to scrape hard packed mud off of roads, driveways and parking lots, then sweep the area clean with the brush. Choice of sweeping directions lets you sweep into tight areas. Optional gutter broom(s) can be mounted on the left, right or both sides of the hopper. Lift the loader arms and open the bucket to dump 15 cubic foot hopper into a truck or trash container.

SWEEPSTER

2800 N. Zeeb Rd • Dexter, MI 48130
(313)996-9116 • 800-627-9378
FAX (313) 996-9014

Quality Products For A Cleaner Environment

Circle No. 141 on Reader Inquiry Card

LAWN CARE

PLCAA members to get break on dues structure for 1991

MARIETTA, Ga. — The Professional Lawn Care Association of America (PLCAA) will use 1991 to make significant structural changes, judging by recent developments.

A new dues structure, proposed to the executive committee at a Jan. 29 meeting in Atlanta, will have the most immediate impact on current PLCAA members. A 1990 dues increase resulted in a number of member companies bolting from the association. Membership, once as high as 1400, now stands at less than 500.

Released by the board was deputy executive director Doug Moody, who joined the PLCAA in 1985. Moody had been involved with a number of member service programs, and was publications director and editor of the association newsletter. Moody's responsibilities will be given to other staffers or contracted out as needed.

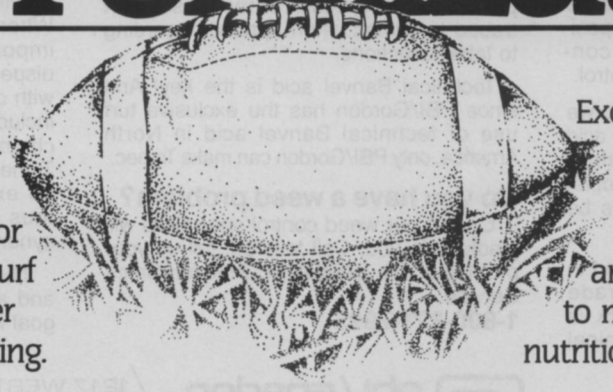
According to a memo from PLCAA president Neal DeAngelo, Moody's former post will remain vacant. DeAngelo says the education committee will be responsible for overseeing all of the association's educational needs.

"The committee will use the outside services of state university and extension people, associate members, our larger member firms and other outside resources," says DeAngelo, who adds that the education committee will also work through state chapters whenever possible.

Moody announced that he will continue to manage and advise associations and companies through his new

continued on page 26

Fall Fertilization



Use Par Ex® Turf Fertilizers containing IBDU® slow release nitrogen for superior quality turf this fall and earlier greening next spring.

Exclusive IBDU® slow release nitrogen is not dependent on microbial activity and it is formulated to meet your regional nutritional requirements.

par ex®
THE EX STANDS FOR EXCELLENCE

For more information contact: Vigoro Industries, Inc. • P.O. Box 512 • Winter Haven, FL 33882
(813) 294-2567

Par Ex® and IBDU® are registered trademarks of Vigoro Industries, Inc.

Circle No. 148 on Reader Inquiry Card

Success. You strive for it every business day.
No matter how you define success, Special Products stands ready to support your efforts to meet (or exceed) your business objectives. You can rely on us for everything from a full line of quality, environmentally sound products to quick and accurate answers to your technical questions.
"Success in business." We want to work with you, because when you're successful, we're successful.

SPECIAL PRODUCTS
A UAP COMPANY
ON THE MOVE

Circle No. 142 on Reader Inquiry Card

Untreated Creeping Bentgrass

Want proof of the effectiveness of SCOTTS® TGR® Turf Enhancer 50 WP?

SCOTTS® TGR® Turf Enhancer 50 WP not only improves the color, density and playability of turf.

It also reduces clippings (by up to 50%).

TGR Turf Enhancer controls turf growth control for tees, fairways and greens, encouraging tightly knit turf stand. As turf growth slows, clippings are reduced and water conserved—offering important economic and environmental advantages with regards to clipping disposal and water management.

When used with nitrogen fertilizers, TGR Turf Enhancer stimulates turf greening for

Treated with TGR Turf Enhancer

Read our clippings.

up to 12 weeks. And it is especially effective on perennial ryegrass turf.

Because Scott has been working with TGR technology for more than 10 years, our Tech Reps offer unsurpassed experience in managing growth regulator applications. Why settle for anything less?

Your Scott Tech Rep is ready to show you how TGR Turf Enhancer can improve the playability of your golf course as part of a total turfgrass program. For more information, contact him today. Or call 1-800-543-0006.

Scotts ProTurf

Growing better through technology.

Circle No. 139 on Reader Inquiry Card

PLCAA *from page 22*
company, Moody Management and Marketing Services.

DeAngelo says the PLCAA will refocus its public relations efforts to include a "much broader range of public relations programs internally." He cites the association's annual report as an example.

Government affairs will undergo little change, according to DeAngelo. □

EVENTS

FEBRUARY

7-8: Alaska Greenhouse & Nursery Conference, Anchorage, Alaska. Contact: Cathy Wright, SR Box 7440, Palmer, AK 99645; (907) 745-4119.

5-12: International Golf Course Conference, Las Vegas (Nev.) Convention Center. Contact: GCSAA, 1617 St. Andrews Dr., Lawrence, KS 66047-7878; (913) 841-2240 or (800) 472-7878.

3: Associated Green Industries of Northeast Ohio Trade Show, Michaud's Town 'N' Country, Strongsville, Ohio. Contact: Associated Green Industries, 10812 Meadow Trail, Strongsville, OH 44136; (216) 572-2784.

14: Connecticut Turf and Landscape Conference, Hartford (Conn.) Civic Center. Contact: Elizabeth Maisano, P.O. Box 876, Bethel, CT 06801; (203) 791-8615.

17-20: ALCA Executive Forum, Radisson Palm Springs (Calif.) Resort and Convention Center. Contact: Associated Landscape Contractors of America, 405 N. Washington St., Falls Church, VA 22046; (703) 241-4004.

19-20: Cash Flow and Cash Flow Budgeting Seminar, Ontario (Calif.) Hilton on the 19th, Oakland (Calif.) Hilton on the 20th. Contact: Micheyl Barnett, California Landscape Contractors Assn., 2021 N St., Sacramento, CA 95814; (916) 448-2522.

21: Arborist Foreman Training Program, Park Hotel, Columbus, Ohio. Contact: Lana Ahlum, Ohio Chapter ISA, P.O. Box 967, Hilliard, OH 43026.

21-22: Landscape Contractor's Association Winter Workshop, Holiday Inn Crowne Plaza, Rockville, Md. Contact: LCA, 9053 Shady Grove Ct., Gaithersburg, MD 20877; (301) 948-0810.

22-23: ALMA Expo, St. Petersburg, Fla. Contact: Barbara Ganz, (800) 992-2562.

27: New Jersey Landscape '91, The Meadowlands. Contact: Skip Powers, 630 Valley Court, Westwood, NJ 07675; (201) 664-6310.

MARCH

2: Long Island Tree Conference, SUNY Farmingdale. Contact: Long Island Arboricultural Assn., P.O. Box 69, Holtsville, NY 11742; (516) 698-3366.

2-3: Tampa Bay Horticultural Trade Show, Florida State Fairgrounds, Tampa. Contact: Trade Show, 6804-C Gunn Highway, Tampa, FL 33625; (813) 920-4393.

13-14: Reinders Brothers Turfgrass Conference, Waukesha (Wisc.) Expo Center. Contact: Ed Devinger, Reinders Brothers, 13400 Watertown Plank Rd., Elm Grove, WI 53122; (414) 786-3301. **LM**

NO MATTER WHAT YOUR NEEDS . . WE HAVE IT IN SOLUTION

GROWTH PRODUCTS

LIQUID PROFESSIONAL FERTILIZERS AND **MICRONUTRIENTS** are formulated for your special turf and horticultural needs.Our products make it **EASIER** for you to **SPOON FEED** special areas like Tees and Greens or **SOLVE DEFICIENCY PROBLEMS.** Take one minute to look over our product line . . .

Our complete balanced blend with methylene ureas for slow release nitrogen and micronutrients.

Growth Products *Liquid Professional Fertilizers* are exclusive products manufactured with only the highest quality materials to assure the *BEST RESULTS* for your turf and horticultural programs. Our products are *TRUE SOLUTIONS.*

. . . . AND CALL US ON OUR TOLL FREE NUMBER FOR OUR CLOSEST DISTRIBUTOR OR TO DISCUSS YOUR PARTICULAR NEEDS . . .

Available in all size containers, 55 gal. drums and bulk deliveries.

GROWTH® PRODUCTS LTD.

1-800-648-7626
914-428-2517 in NY
FAX: 914-428-2780

P.O. Box 1259
White Plains, NY 10602

Circle No. 111 on Reader Inquiry Card

Tree Pro•tector™

DEVELOPED AND USED BY PROFESSIONALS.

Protect trees from permanent damage and possible death caused by string trimmers and lawn mowers. • One-of-a-kind cushioning shape. • Available in two colors to blend with nearly any landscaping. • Ultraviolet protected to prolong product life. • Expandable by linking two or more together for larger trees. Seconds to install. Reusable.

Call now for the name of your local representative or retailer.

1-800-628-7689

SEABERRY *LANDSCAPING INC.* • 3259 Terminal Drive • Eagan, MN 55121 • 612-454-9511

Circle No. 138 on Reader Inquiry Card

PENNINGTON

DELIVERS YOUR SEED NEEDS NATIONWIDE

Quality Brands...Research...Production...Personal Service

Finelawn TURF TYPE TALL FESCUE **5GL**

Finelawn 1 TURF TYPE TALL FESCUE

Alfaxalon TURF-TYPE TALL FESCUE

TRIAD
TURF TYPE TALL FESCUE BLEND

PERFECTA
DURABLE TALL FESCUE MIXTURE

FLYER
CREEPING RED FESCUE

Call Toll Free
1-800-277-1412

For additional information write
PENNINGTON SEED, INC. Turf Dept.
P.O. Box 290 • Madison, Georgia 30650

DISTRIBUTION CENTERS

1. Pennington Seed, Inc. of Madison Madison, GA (404) 342-1234
2. Pennington Seed, Inc. of Columbia Columbia, SC (803) 771-4222
3. Pennington Seed, Inc. of Cullman Cullman, AL (205) 734-9486
4. Pennington Seed, Inc. of Orlando Orlando, FL (407) 295-6271
5. Pennington Seed, Inc. of Greenfield Greenfield, MO (417) 637-5979
6. Pennington Seed, Inc. of Louisiana Hammond, LA (504) 386-7611
7. Pennington Seed, Inc. of Virginia Petersburg, VA (804) 732-4769
8. Alby's Jacksonville, FL (904) 721-1200
9. Mid-South Seeds, Inc. N. Little Rock , AR (501) 945-1474

PRODUCTION FACILITIES

10. GTO-TEC, INC. Eatonton, GA
11. CACTUS SEED COMPANY, INC. Roll, AZ
12. Pennington Seed, Inc. of Oregon Lebanon, OR

Ask for:

PENKOTE
Increased Plant Survival
Fungus Protection
Increased Drought Tolerance
Less Attractive to Birds

Insure your stand.

CHEYENNE
TURF TYPE / BERMUDAGRASS

TRIPLE PLAY
ELITE PERENNIAL RYEGRASS BLEND

Stallion
TURF TYPE PERENNIAL RYEGRASS

sunrise
Two Forty Six
TURF TYPE PERENNIAL RYEGRASS

Chateau
PREMIUM KENTUCKY BLUEGRASS

Pebble Beach
Perennial Ryegrass
(Turf Type)

Circle No. 132 on Reader Inquiry Card

FINALLY A ZERO-TURN RIDER GOOD ENOUGH TO BE CALLED A SCAG.

FINALLY A ZERO-TURN RIDER GOOD ENOUGH TO BE CALLED A SCAG.

Since pioneering Scag's award-winning zero-turn walk-behind, our engineers have been hard-at-work developing a zero-turn rider of equal performance and innovative design. It's been a tough act to follow, but they've finally done it. Introducing the zero-turn rider good enough to be called a Scag.

Floating articulating cutter deck provides a smooth cut on uneven turf.

UNIQUE OUTFRONT/COMPACT DESIGN

Scag's new zero-turn rider is two mowers in one. Its outfront cutter deck lets you cut close to trees and buildings, while its compact design and zero-turning capability enable you to move in and out of even the trickiest landscaped areas. This zero-turn rider also features Scag's unique cast-iron pump/motor drive system for extended hydro life.

FULL-FLOATING, ARTICULATING CUTTER DECK

Scag's new zero-turn rider virtually eliminates scalped turf. We've designed an all-new, full-floating, articulating cutter deck that automatically responds to every contour in the ground. Simply set the desired cutting height and you can depend on a smooth, even cut every time. You can also add a powerful, rear-mounted 40 gallon vacuum grass catcher as an option.

Engine and drive components are conveniently located for simplified maintenance.

For more information about our new zero-turn rider, see your local Scag dealer today and find out why it's Simply the Best.

EASY LEASE TERMS!
Ask your dealer for details.

SIMPLY THE BEST

SCAG
POWER EQUIPMENT

SUBSIDIARY OF METALCRAFT OF MAYVILLE, INC.
1000 Metalcraft Drive, Mayville, Wisconsin 53050

EXPO 90

OVERALL WINNER
SCAG ZERO-TURN WALK-BEHIND

© SCAG POWER EQUIPMENT, 1990. ALL RIGHTS RESERVED.

THE BEST ISN'T ALWAYS
THE BEST KNOWN
Not everyone knows the GRAZER name, but those who do also know GRAZER is today's best value in mowing products. Features such as fingertip control hydrostatic drive, a true zero turning radius, tilt back deck and exceptional weight distribution make GRAZER the name to look for. Write or call for more information today.
GRAZER
GRAZER DIVISION, M&W GEAR COMPANY
ROUTE 47 SOUTH, GIBSON CITY, ILLINOIS 60936
PHONE: 217/784-4261

Circle No. 120 on Reader Inquiry Card

SAVE UP TO 40%
ON
PROTECTIVE GOLF NETTING

FOR THE RANGE

- Made of 100% polypropylene.
- Long lasting and durable.
- Simple installation. Netting can be attached to cables with hog rings. Custom length available.
- Available in 3 popular sizes:

  6-1/2' High x 150'

  25' High x 100'

  25' High x 150'.

FOR INDOOR USE

- Made of 100% nylon.
- Small mesh construction stops golf balls safely.
- Sturdy enough to take a direct hit.
- Custom design your own teaching area or cage.

Custom Work Is Our Specialty

CALL NOW FOR A QUOTE

800-633-2354
FAX 205-237-8816

Gold Medal
Recreational Products

Blue Mountain Industries, Blue Mountain, Alabama 36201

Circle No. 103 on Reader Inquiry Card

PEOPLE

Solomon, Wetsel, Riordan honored by various groups

The Irrigation Association named **Dr. Kenneth H. Solomon** its 1990 Man of the Year. Solomon, the 31st recipient of this award, is director of the Center for Irrigation Technology in Fresno, Calif.

The IA also honored **Frank W. ("Pat") Murphy**, founder of the Murphy Manufacturer Co. in Mt. Carmel, Ind., with its Industry Achievement Award.

Bob Wetsel has been named Seedsman of the Year by the Atlantic Seedsmen's Association. Wetzel is senior vice president of Wetsel Seed Co., Harrisonburg, Va. He served as the group's president in 1982.

Seed Research of Oregon has selected the University of Nebraska's **Dr. Terry Riordan** winner of its "Excellence in Research" award. Riordan won for developing new cultivars of buffalograss, St. Augustinegrass and Kentucky bluegrass. The turf-type buffalograsses were developed for environmental reasons.

PGMS officers

New officers of the Professional Grounds Management Society are: **Thomas L. Smith** of Spring Grove Cemetery in Cincinnati, president; **John Abernethy Jr.** of the City of Lenoir, N.C., first vice president; **John Michalko** of Case Western Reserve University in Cleveland, second vice president; **Robert F. Rubel** of Rubel's Landscape Services in Fort Worth, Texas, treasurer. Regional directors most recently elected are **Earl Wilson, Charles Wilson** and **Teddi Davis.**

Other awards

Elin D. Miller has been made 1990 Honorary Member of the Western Agricultural Chemicals Association (WACA). She recently resigned as WACA executive director, a position she held for 4½ years. At the same time, WACA chose **A.M. "Bo" Bolin** as 1990 Outstanding Member. Bolin is Western district sales manager for Dow-Elanco.

Cuyamaca College's **Dr. Brad Monroe** received the Edwin J. Hunter Conservation Award. The instructor and landscape designer in El Cajon, Calif., introduced the first horticulture program at the school and wrote the course curriculum.

Other movements

Michael G. Pruett has been promoted to vice president of Environmental Care of Livermore, Calif. He had been a branch manager. Pruett has been with Environmental since 1976, when he graduated from Cal Poly Pomona with a degree in park administration.

New president of the Mississippi Turfgrass Association is **Max Maxwell** of The Country Club of Jackson. Maxwell was the organization's Outstanding Turf Professional in 1987.

Dr. Tim Bowyer has been nominated to serve on the Golf and Landscape Operations Industry Advisory Committee for Lake City (Fla.) Community College. Dr. Bowyer is president of Southern Turf Nurseries.

Professor of ornamental horticulture and landscape design **Dr. Donald B. Williams** of the University of Tennessee at Knoxville was named 1990 Outstanding Undergraduate Educator by the American Society of Hort Science.

Lex Dalton, former president and general manager of The Daltons of Indiana has joined Lawn Rangers of Warsaw, Ind. He'll direct marketing and right-of-way maintenance. **LM**

Professional turf performers.

First-rate disease and weed control demands a professional's touch. And here are the Turf Care products that have what it takes.

Daconil 2787® The cornerstone of a professional spray program. Daconil 2787 is economical to use and the most effective, broadest-spectrum turf fungicide on the market. Controls 12 major turfgrass diseases. Available as a flowable or wettable powder formulation.

Daconil 2787® WDG. A new water-dispersible granular formulation that is virtually dust-free. Pouring and mixing are fast and easy. The 5-lb. reclosable container means better handling, storage and disposal.

Dacthal® The preemergence herbicide that consistently delivers superior broad-spectrum control of crabgrass, spurge and 22 other tough annual grasses and broadleaf weeds. Available as a flowable or wettable powder formulation.

Daconate® 6. The proven postemergent herbicide. Highly effective against pesky weeds such as crabgrass. (Sold as Bueno® 6 in western states only.)

2 Plus 2 (MCPP + 2,4-D Amine). As effective as it is economical against more than 20 hard-to-kill broadleaf weeds such as clover and dandelions. Contains no dicamba.

Frigate® adjuvant. The only product specifically formulated to enhance the performance of Roundup* for control of perennial and annual weeds. For turf renovations and non-cropland use, too.

When it comes to turf care, you'll see the difference in the professional's touch.

ISK Biotech Corporation, 5966 Heisley Road, P.O. Box 8000, Mentor, OH 44061-8000.

The Turf Care® pros.

*Roundup is a registered trademark of Monsanto Company. Always follow label directions carefully when using turf chemicals.

Circle No. 113 on Reader Inquiry Card

COVER STORY

PRICING FOR PROFIT: AN INTRODUCTION

Are you charging the 'right' price for landscaping services? In part one of this two-part in-depth article, various practical approaches to pricing are examined.

by Travis Phillips, Ph.D., Mississippi State University

Landscape managers have always had a problem of arriving at the most accurate price to charge for services. In spite of understanding actual incurred costs better, the problem of discovering this "proper" price has tended to become more evasive. The main reason is that businesses have tended to offer customers larger and much more diverse services.

Any person who has ever had to worry about pricing a service knows the answer to the question of "what price?" is simple. You charge a price that covers all costs, plus an acceptable level of profit. But the culprit in applying this simple principle is figuring out how to allocate the proper amount of overhead cost and profit to each unit of service.

Even if you've established a price that provides an acceptable level of profit, further consideration should be given before making the quote. Either a higher price may be possible, or the desired price may be unobtainable.

Approaches to pricing

1. Adjustment of previous price.

A common pricing method is merely to use the previous price or bid with a more-or-less arbitrary adjustment. Since this earlier price was not objectively determined, neither is the new one. Profits for the business as a whole may have been acceptable; however, some products may have been priced "too high," while others were "too low."

2. Budgeted price.

A second method is based on budgeted costs plus a profit. While more precise than percentage adjustments from the past, there are problems in applying this concept.

Suppose we want to know what to charge per hour for a machine and operator. The machine costs $16,000 and is expected to have a $4,000 salvage value after 10 years.

The machine is expected to be used for 400 hours per year. Over its life, repairs for the machine are expected to be 60 percent of its initial costs. Repairs, fuel and lubrication are estimated at $5.45/hour. Average annual fixed costs (depreciation, interest on investment, insurance and taxes) are estimated at $3,020. Dividing total annual fixed cost by the 400 hours of use, the hourly cost is $7.55. Adding variable costs to fixed, we are at a $13/hour cost.

Next we add an operator for the machine. Suppose this cost is $7/hour, including payroll taxes directly attributable to having the person em-

ployed. We are now up to $20 ($13 + $7)/hour. The above cost includes a 15 percent charge for interest on the investment cost.

This does not mean that we can hire out this machine and operator at $20 per hour and make a 15 percent return on the investment. The business has a $100,000 overhead, and an interest charge was not made for the operating funds associated with the variable cost of the machine and its operator. None of this is included in the $20. How much of the overhead per hour should be added?

True profit is the combined payment for the owner's labor and management and for his investment or equity.

Since the business consists of numerous activities, there is no logical method of assigning to equipment and operator their share of the overhead. So—even though we know the cost involved—simple budgeting does not tell us how to price out the equipment.

The budgeting procedure, however, is better in the end than just adjusting a previous price; it identifies variable and fixed costs associated directly with the machine.

3. Targeted return on investment. A more positive approach, one that provides a means for allocating overhead, is based on beginning with pricing to meet a targeted return on investment (ROI).

This procedure provides an estimate that covers all costs, including overhead, plus the pre-selected return on equity. The procedure has been widely presented by the Association of Landscape Contractors of America (ALCA). Broader and more varied applications are presented by Spencer A. Tucker in his book "Pricing for Higher Profits" (McGraw-Hill, 1966). Although the procedure is no cure-all, it does provide a framework for using already available accounting data.

Defining profit

In the usual accounting procedures, expenses are payments you must make for using your various resources. Profits are the payments received for those not specifically identified as expenses.

continued on page 34

Table 1.

Past year's income statement, by departments

Item	Department			Total
	Contract	Service	Merchandise	
Sales	$292,011	$90,849	$175,702	$558,562
Beginning inventory	$32,273		32,608	64,881
Purchases	95,841	5,691	91,142	192,674
Ending inventory	36,250		31,034	67,284
cost of goods	91,861	5,691	92,716	190,271
Gross profit	200,147	85,158	82,986	368,291
Expenses				
Contracting supplies	5,757			5,575
Vehicles	14,227	14,227	1,000	29,454
Equipment rental	2,303			2,303
Salaries	109,605	51,054	46,610	202,269
Advertising	1,964		4,583	6,547
Repairs	1,341	1,340		2,681
Rent	7,174	1,000	4,026	12,200
Taxes-payroll	9,126	4,250	3,464	16,840
-property	1,332	184	743	2,259
Depreciation	10,355	7,141	357	17,853
Utilities	4,384	877	12,274	17,535
Dues and subscription	474		475	949
Buying expenses	85		85	170
Credit card discounts	262		786	1,048
Professional fees	5,444	158	286	5,888
Insurance	8,264	3,849	3,138	15,251
Office supplies	2,587	892	1,706	5,185
Net interest	3,051	1,052	2,012	6,115
Miscellaneous	554	191	364	1,109
Total expenses	188,289	86,215	76,909	351,413
Net profit	11,858	(1,057)	6,077	16,878

Table 2.

CONTRACTING DEPARTMENT: Income statement for past year by classified costs

Item	Direct Cost	Overhead Costs		Total
		Variable	Fixed	
Sales				$292,011
Beginning inventory				32,273
Purchases				95,841
Ending inventory				36,250
Cost of goods				91,864
Gross profit				200,147
Expenses				
Contracting supplies	—	$ 5,757	—	$ 5,757
Vehicles	$11,327		$ 2,900	14,227
Equipment rental	2,303			2,303
Salaries	79,605		30,000	109,605
Advertising		1,964		1,964
Repairs		1,341		1,341
Rent			7,174	7,174
Taxes-payroll	6,426		2,700	9,126
-property			1,332	1,332
Depreciation			10,355	10,355
Utilities			4,384	4,384
Dues & subscriptions			474	474
Buying expenses		85		85
Credit card discounts		262		262
Professional fees		0	5,444	5,444
Insurance		4,524	3,740	8,264
Office supplies		2,587		2,587
Net interest			3,051	3,051
Miscellaneous		554		544
Total expenses	99,661	17,074	71,554	188,289
Net profit				11,858

Table 3.

CONTRACTING DEPARTMENT: Income statement for past year

Item	Dollars	Percent of Sales
Sales	292,001	100.00
Direct costs		
Cost of goods (materials)	91,864	
Vehicles	11,327	
Equipment rental	2,303	
Labor	79,605	
Labor burden	6,426	
Total direct	191,525	65.59
Overhead costs		
Variable		
Contracting supplies	5,757	
Advertising	1,964	
Repairs	1,341	
Buying expense	85	
Credit card discounts	262	
Insurance	4,524	
Office supplies	2,587	
Miscellaneous	554	
Total variable	17,074	5.85
Fixed		
Vehicle insurance	2,900	
Administrative salaries	30,000	
Salary burden	2,700	
Rent	7,174	
Property taxes	1,332	
Depreciation	10,355	
Utilities	4,384	
Dues and subscriptions	474	
Professional fees	5,444	
Insurance	3,740	
Interest	3,051	
Total fixed	71,554	24.50
Total overhead	88,628	30.35
Net profit	11,858	4.06

Table 4.

CONTRACTING DEPARTMENT: Projected income statement for next year by classified costs

Item	Dollars	Percent Sales Exposure	
Sales	343,627	100.00	
Direct costs			
Cost of goods (materials)	108,105		
Vehicles	13,329		
Equipment rental	2,710		
Labor	93,679		
Labor burden	7,562		
Total direct	225,385	65.59	100.00
Overhead costs			
Variable			
Contracting supplies	6,778		
Advertising	2,312		
Repairs	1,579		
Buying expenses	100		
Credit card discounts	309		
Insurance	5,326		
Office supplies	3,046		
Miscellaneous	652		
Total variable	20,102	5.85	8.92
Fixed			
Vehicle insurance	3,248		
Administrative salaries	33,600		
Salary burden	3,024		
Rent	8,035		
Property taxes	1,492		
Depreciation	11,597		
Utilities	4,910		
Dues and subscriptions	531		
Professional fees	6,097		
Insurance	4,189		
Interest	3,417		
Total fixed	80,140	23.32	35.56
Total overhead	100,242	29.17	44.48
Net profit	18,000	5.24	

PROFITS *from page 33*

For example, in an *unincorporated* business, the owner/manager cannot pay himself and consider it an expense. A return on the investment in the owner's equity cannot be considered an expense. Therefore, the true profit is the combined payment for the owner's labor and management and for his investment or equity.

In order to separate profit into the two components, we must value one resource and subtract it from the profit in order to estimate the value of the other. Typically, economists place a value on the labor and management resource and subtract this value from profit to have the return on equity.

How are labor and management valued? This owner/manager has a value as an employee performing a similar function in another business. So the value of the person's best alternative employment is subtracted from profit to leave a residual we call return on equity, or return on investment.

How is the situation changed if the business is *incorporated*?

Since the owner/manager becomes an employee of the corporation, his or her salary is included as an expense. If he/she has paid him/herself at the alternative rate, profit now reflects ROI. This will be assumed from now on in this explanation of pricing for profit.

Valuing assets

Accounting creates yet another problem for economists who want to treat alternative investments comparably.

Assets are valued at book value (their purchase price less depreciation, if applicable). Assets acquired some years ago may have a current market value considerably above book value. The rapid recovery system allowed by recent tax laws have also allowed write-off much faster than the actual decline in value.

Therefore, assets should be evaluated at current market value rather than at book value. If an alternative investment would yield 12 percent, a true ROI should be calculated as if existing assets were cashed out and invested at 12 percent.

Next month: Get out your calculators!—Pricing by target return on investment. LM

Dr. Phillips is a professor/economist in the Department of Agricultural Economics at Mississippi State University. He has written numerous articles on the economics of crop and horticulture production, and has developed and presented marketing programs for Mississippi landscape maintenance firms.

Woods makes the grade... the commercial grade, that is.

Since our introduction of the first tractor powered rotary mower in 1947, customers have consistently awarded our equipment top grades for innovation and reliable performance.

Now we've applied our engineering and manufacturing expertise to an expanded line of commercial turf maintenance equipment. From the design stage right through component specification and assembly, these products are in a class by themselves.

mow 'n machines™

Zero turning radius mowers in five tractor sizes with mowing decks from 44" to 72".

Walk-Behind Mowers

Smooth operating hydrostatic drive mowers with cutting swaths from 36" to 61".

Landscape Rakes

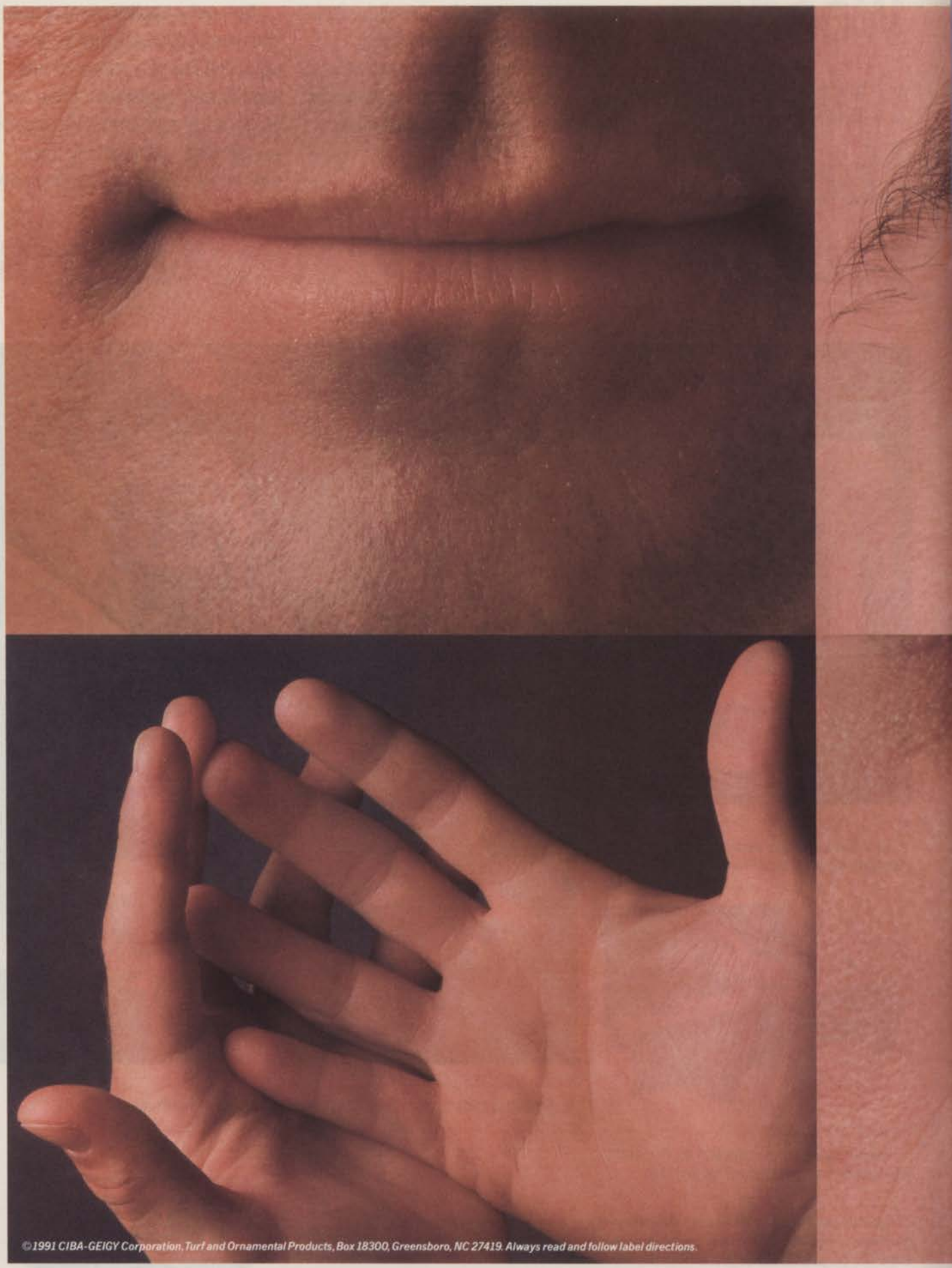
Seven rugged model series in 6 ft., 7 ft. and 8 ft. lengths for tractors rated up to 60 hp.

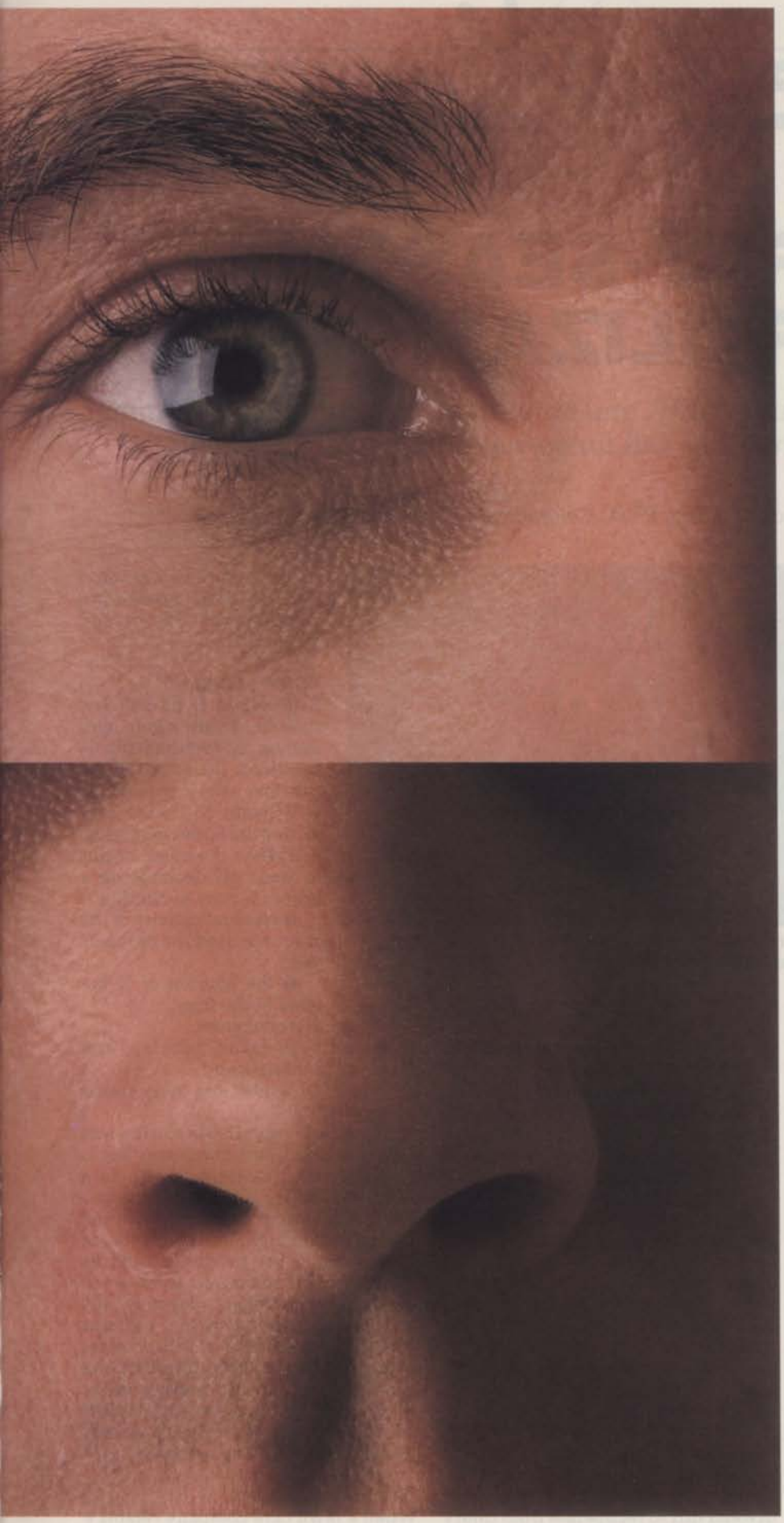
Isn't it time you moved to the head of the commercial grounds maintenance class with Woods professional equipment? For more information contact your Woods dealer or write today to Woods, Dept. LM, Oregon, Illinois 61061.

WOODS®

Division of Hesston Corporation

Circle No. 151 on Reader Inquiry Card


©1991 CIBA-GEIGY Corporation, Turf and Ornamental Products, Box 18300, Greensboro, NC 27419. Always read and follow label directions.



SINCE WE INTRODUCED OUR FUNGICIDE, IT'S JUST NOT SHOWING UP IN A LOT OF PLACES.

To minimize employee exposure and handling, we introduced Pace® in water-soluble packets.

The result? No dust, no measuring, and no need to haul leftover containers to some special waste dump.

These benefits, plus a unique chemistry that combines systemic and contact properties, make Pace the best fungicide for Pythium found anywhere.

Anywhere, that is, except the human body.

Circle No. 105 on Reader Inquiry Card

EARLY-SEASON FERTILIZATION

Depending on desired turf quality, and amount of spring and early summer activity, many situations call for spring nitrogen fertilization.

by Anthony J. Koski, Ph.D., Colorado State University

Spring time brings daffodils, crocuses, and—hopefully—the greening of grass. Along with the wide acceptance of late-season fertilization, many turf managers seemed to have developed a fear of fertilizing in the spring.

While it is true that improper nitrogen use in the spring can bring about a host of problems, adopting a late-season fertilization philosophy generally does not allow you to eliminate spring nitrogen (N) applications.

Pink patch and red thread can become severe during the spring on N-deficient turf.

Not to excess

Stimulating shoot growth during the spring can detrimentally affect the depth and number of roots. Since this is the time of year when most of the roots for cool-season turfgrass species are being formed (Fig. 1), it is important that root formation not be discouraged.

Large applications (greater than one pound of N/1000 sq. ft.), especially of quickly-available N sources, can substantially reduce root growth of cool-season species. Excessive spring shoot growth shifts carbohydrate use from the roots to the shoots, thus reducing the number and health of new roots. The root and shoot growth patterns of warm-season grasses are different, and spring N applications are less apt to negatively affect root formation (Fig. 2).

Overuse of nitrogen during spring, resulting in high shoot growth, necessitates frequent mowing.

Diseases may increase

The incidence and severity of some diseases may be increased by overfertilization in the spring. The leafspot (Helminthosporium) diseases, patch diseases, and high- and low-temperature pythiums are favored by excessive N applications. Recovery from damage caused by these diseases is more difficult, since exhaustion of carbohydrate reserves is a consequence of N overuse.

Reduced stress tolerance: The zealous use of N in spring may reduce summer drought resistance and heat tolerance. This is partly attributable to effects on the roots, but also because of lowered carbohydrate levels and the formation of excessively hydrated leaves.

Effects on lateral growth: High N rates can diminish the number and vigor of lateral stems (stolons and rhizomes). The ability for a trafficked or divoted turf to recuperate from injury is lowered. Low carbohydrates and hydrated leaves may effect sod strength.

When spring N?

Late-season N doesn't last forever. Even when late-season N fertilization is practiced, the effects of the previous year's application will begin to "wear off" during the following spring. Just *when* the effect begins to wear off depends on a host of factors, including:

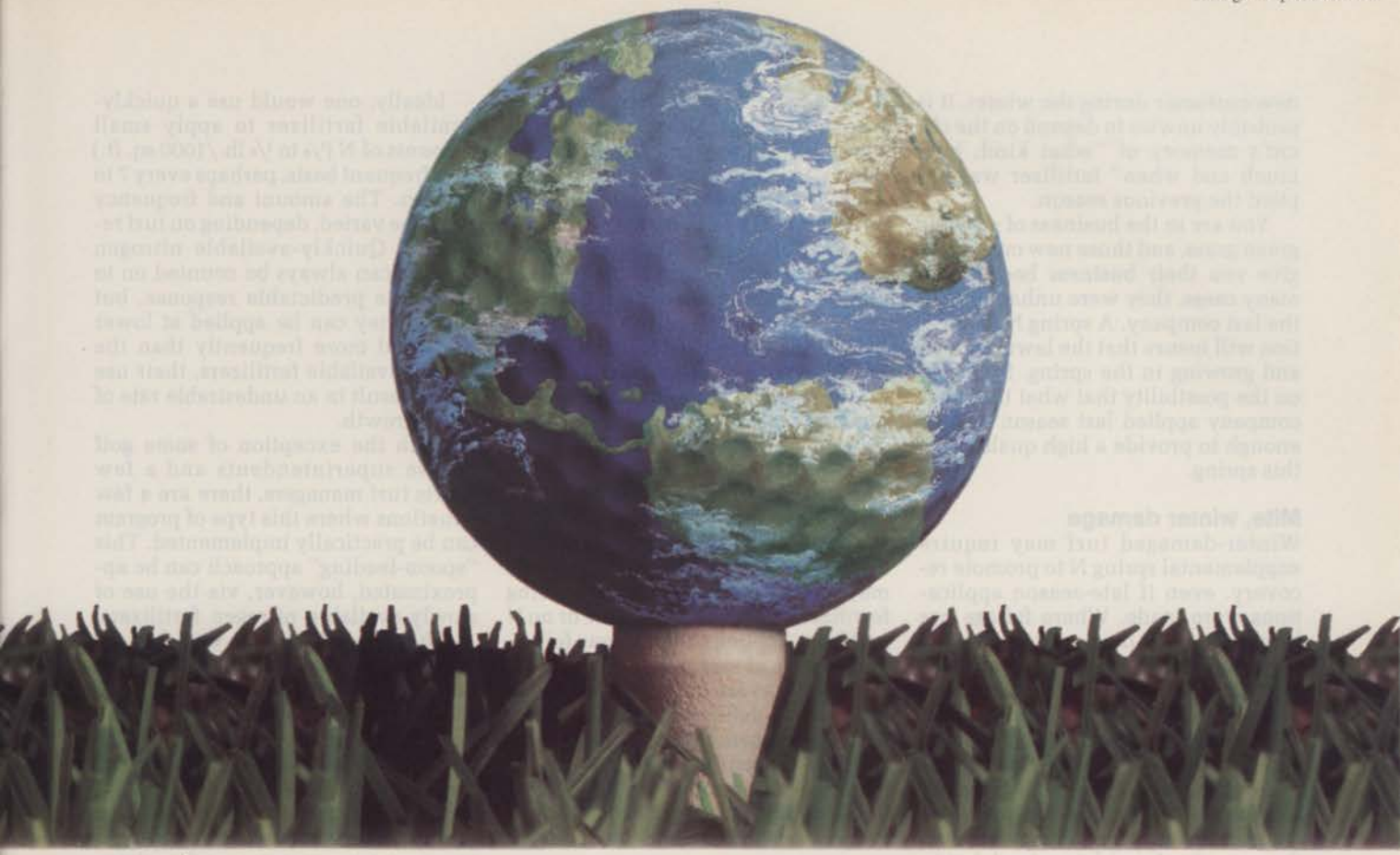
- residual activity of the N source used the previous year,
- the amount of N applied at the time,
- the species of grass,
- soil type (sand vs. clay, and leaching potential), and
- level of winter and early spring precipitation.

If a quickly-available source was used in the fall, the effect may begin to dissipate during early to late May, especially if the turf is growing on a sandy soil and winter/spring rain is high. If higher rates of slowly-available products such as IBDU or sulfur-coated urea were used, the residual activity may persist longer into the spring, perhaps into early summer. In either case, some N should be applied in the spring, either to maintain quality during the spring, or to provide an N source that would release slowly during the following summer.

The new customer

When a lawn care company retains a

© Ringer Corporation, 1990



Ringer will give your turf a world of improvement.

Ringer Greens 6-1-3, Turf 10-2-6 and Greens Super 10-2-6 give you a whole new approach to greener greens, fairer fairways and tougher turf.

Natural protein, slow release nutrition. Ringer products use natural protein sources for slow-release nutrition without chemicals. Applied at recommended rates they will not burn.

More than a quick fix. Because they rely on a unique microbial action, Ringer products work by enhancing natural processes. Your turf has a healthier environment. And it keeps getting better and better.

Scientifically formulated, environmentally sound. Greens 6-1-3, Turf 10-2-6 and Greens Super 10-2-6 were scientifically developed for professional use. They fit right in with your present program and strengthen your current disease control efforts.

Try Greens 6-1-3, Turf 10-2-6 and Greens Super 10-2-6 for a season on a problem lawn. You'll find that because they are environmentally sound, they improve the world a little as they improve your turf a lot.

Call or write for details and the name of your distributor.

RINGER®
Better, naturally

Recommended by The Arnold Palmer Golf Management Co.

Circle No. 136 on Reader Inquiry Card

Ringer Corporation, 9959 Valley View Road, Minneapolis, MN 55344, 612-941-4180

new customer during the winter, it is probably unwise to depend on the client's memory of "what kind, how much and when" fertilizer was applied the previous season.

You are in the business of growing green grass, and those new customers give you their business because, in many cases, they were unhappy with the last company. A spring N application will insure that the lawn is green and growing in the spring. Don't bet on the possibility that what the other company applied last season will be enough to provide a high quality turf this spring.

Mite, winter damage

Winter-damaged turf may require supplemental spring N to promote recovery, even if late-season applications were made. Where foliage has been killed by desiccation or snow mold (but crowns and roots are still living), fertilization may hasten recuperation. Of course, nitrogen will not resuscitate dead turf, so make sure it is still alive before fertilizing.

In some areas of the country, various species of mites cause turf damage. Quite often the turf is dead by the time the cause has been determined, but in some cases only the foliage has been damaged and a bit of nitrogen can hasten recovery and promote growth that will outpace the injury being caused by the mites. Remind clients that fertilizer applications cannot be expected to "kick in" unless sufficient precipitation occurs, or irrigation is provided, following fertilization.

Athletic applications

Football fields are often used for practice or games late in the fall, long after temperatures have cooled to the point that recuperation is possible. These same fields are often used early the following year for spring games and drills, resulting in even greater damage.

On these fields, spring fertilization is necessary to promote growth and recovery of the damaged turf. Similiarly, spring baseball can be devastating to slow-growing fields, espcially if the same field is used for both practice and games.

Other high-use athletic areas, such as soccer fields and multi-use fields in city parks, can also benefit from springtime fertilization. On such heavy-use fields it is not unusual to fertiilize with as much as 8 to 10 lbs. N/1000 sq. ft. over the course of a growing season.

Averting diseases

Certain disease problems can be averted, or at least be decreased in severity, by wise spring N applications. Turf damaged by snow mold may recover more quickly with spring fertilization, especially if little or no N had been applied the previous fall.

Red thread and pink patch can be especially severe during a cool, moist spring on N-deficient turf. The severity of zoysia patch disease, most common on intensively-managed zoysia in the transition zone, may be reduced by spring and summer nitrogen applications.

Amount and frequency

The goal of any spring fertilization program should be to promote greenup and a pre-determined growth level, without producing a fast-growing, succulent turfgrass plant. This can be difficult for a number of reasons, the main one being that shoot growth is naturally rapid at this time of year. A complicating factor is the unpredictability of spring weather, most importantly temperature and precipitation. Since release of N from all fertilizer sources more or less depends on moisture, with some also being quite temperature dependent, the choice of a fertilizer (and determination of how much to apply) for spring use can be difficult.

Ideally, one would use a quickly-available fertilizer to apply small amounts of N (1/8 to 1/4 lb./1000 sq. ft.) on a frequent basis, perhaps every 7 to 14 days. The amount and frequency could be varied, depending on turf response. Quickly-available nitrogen sources can always be counted on to provide a predictable response, but unless they can be applied at lower rates and more frequently than the slowly-available fertilizers, their use might result in an undesirable rate of shoot growth.

With the exception of some golf course superintendents and a few sports turf managers, there are a few situations where this type of program can be practically implemented. This "spoon-feeding" approach can be approximated, however, via the use of slowly-available nitrogen fertilizers.

This generally works well, but remember: you are depending on Mother Nature to provide conditions conducive to release of N for the turfgrass plant.

Slowly-available nitrogen sources that do not work well (or predictably) during early spring would be ideal for late spring or summer use, since you can count on warmer and moister conditions to prevail at those times. Some natural organic fertilizers and those with a high percentage of their N as longer-chain ureaformaldehyde polymers (Nitroform) must be applied at relatively high rates (1.5 to 2 lbs. N/100 sq. ft.) in order to elicit a noticeable short term response from the turf, even under conditions favoring the release of their nitrogen.

If you are able to make light, frequent spring N applications, using a quickly-available N source (urea, ammonium sulfate) would be ideal. If you are locked into making one or two applications during the spring, consider using a 1/2 or 3/4 rate of a quickly-available source early, and a more slowly-available N source (1 lb. N or

FIGURE 1

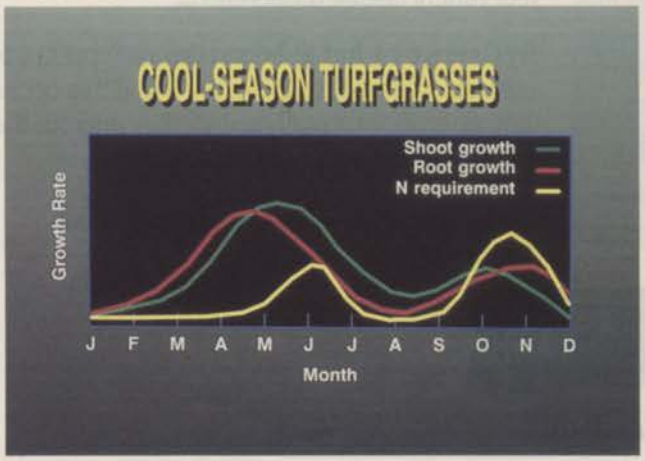
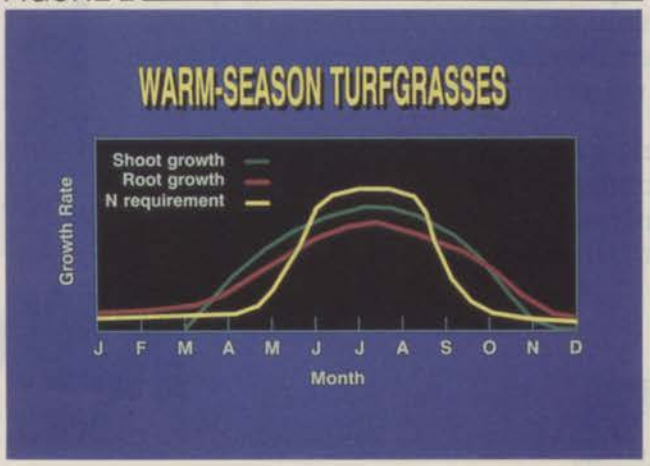


FIGURE 2



UNLEASH THE BIG CATS.

The Jacobsen Turfcat family . . . the rugged breed that thrives on tough conditions.

Tall, thick grass. Undulating terrain. Even snow. You name it. Jacobsen Turfcats do more than survive tough operating conditions. They master them. Quickly and efficiently.

Pounce on one of seven gutsy Turfcats from 17-hp to 36-hp, in 3-wheel and 4-wheel models. Exclusive 2-speed, full-time, limited-slip transaxle delivers maximum power and traction in low range, to cut more and climb higher. Shifting to high range increases transport speeds, so you lose less time between jobs.

For superior stability, Turfcats have a low center of gravity and a hill-hugging, wide-track stance. Plus, quick, easy steering lets these agile cats dart around trees and in-and-out of tight spots.

The largest Turfcats give you an exclusive hydraulic implement drive system that eliminates belts, drive shaft and universal joints for reduced maintenance. And the harder you work this power delivery system, the better it works.

Tackle mowing tasks with your choice of durable 50", 60" or 72" rotary decks. The rugged Deep-Tunnel rotary decks channel clippings out faster to increase cutting capacity without windrowing or clumping. In areas where thrown objects and noise are a concern, use the 50" or 60" fine-cut flail decks with downward discharge and a cut rivaling reels.

Turfcats won't hibernate once your mowing's done. Blades, brushes, snow blowers and a variety of other attachments keep these cats producing year-round.

So take a Turfcat for a run. Arrange a free demonstration with your Jacobsen distributor today. Attractive lease and finance plans available. Or for more information contact: Jacobsen Division of Textron Inc., Racine, WI 53403.

JACOBSEN
TEXTRON
Jacobsen Division of Textron Inc.

© Jacobsen Division of Textron Inc. 1988 J-6-8

Circle No. 114 on Reader Inquiry Card

Slow and quick release fertilizers

Quickly-available sources: These are water-soluble and not dependent on temperature to release their nitrogen.

Some, such as potassium nitrate, contain N in the form of nitrate (NO_3). Others, such as urea, ammonium sulfate, mono- and diammonium phosphate, have nitrogen in the form of ammonium (NH_4).

Ammonium nitrate contains both forms of nitrogen. Urea is an important N source, since it forms the basis for nearly all of the slowly-available nitrogen fertilzers, with the exception of the natural organic fertilizers.

The quickly-available nitrogen sources are ideal for "spoon feeding" and for use under cold conditions, when many many slowly-available sources do not perform adequately. They are relatively inexpensive, but may result in higher labor costs if they are applied frequently. The potential for "burn" is also greater with the quickly-available sources, mainly due to their higher salt indexes.

Slowly-available sources: It is more difficult to keep up with the types of fertilizers in this category, since changing technologies continue to result in new fertilizers. Within this category are *slow-release (or controlled release) fertilizers* that encapsulate a quickly-available fertilizer (usually urea) with a sulfur or plastic coating that degrades over time, slowly releasing the enclosed nitrogen source. Examples include the sulfur-coated and resin-coated fertilizers. These types of fertilizers generally contain enough free urea, or other soluble N source, to provide adequate short-term response, while providing the benefits of long-term, slow-release fertilization. Sulfur-coated urea has a history of performing well in lawn care and many golf course applications.

A new product from Grace-Sierra, with the trade name Once, can be applied once during the year to provide season-long feeding. In two years of testing at Colorado State University this resin-coated product has performed very well. These coated products require adequate soil moisutre to aid in breakdown of the coating, as well as to allow for solubilization of the enclosed N source and its subsequent movement into the root-zone. They will not perform well under dry conditions. On heavily-trafficked turf (especially if compacted and with little thatch), the coated products are subject to mechanical breakage, thus negating the slow-release characteristics of the fertilizer. On very close-cut turfs, such as tees or putting greens, the particles may be damaged (or picked up) during mowing.

Slowly-soluble: This category would include such fertilizers as IBDU and ureaformaldehyde. The N in these fertilizers is released via the action of hydrolysis (water) and/or microbial activity. Both types are quite moisture dependent. The UF fertilizers are also temperature-dependent, since the level of microbial activity is governed by soil temperature, in addition to the presence of adequate moisture. Thus, IBDU should work effectively under cool, moist conditions, while long-chain UF types will not perform nearly as well. Fertilizers containing UF are better-suited to summer use.

Natural organics popular

Natural organic fertilizers have become quite popular in recent years. Derived from plant or animal by-products, they include products like activated sewage sludge (Milorganite), dehydrated poultry waste (Richlawn products, Sustane), and dried blood, bone and seed meals (the Ringer products). These fertilizers depend on microbial activity to release much of the nitrogen contained in them. Interestingly, the Ringer and Richlawn products have performed very well under cool condintions in Colorado testing, probably because blood meal will release N quite quickly. These products require good levels of soil moisture to work well, and may not perform up to expectations under dry conditions (even if temperatures are warm).

—*Dr. Koski*□

Characteristics of Nitrogen Fertilizers

Fertilizer Source	N Percentage	N Source	Moisture Dependence	Temperature Dependence	Residual Activity	Burn Potential
QUICKLY-AVAILABLE N						
Ammonium nitrate	33	ammonium nitrate	low	low	short	high
Ammonium phosphates	11-21	mono/di-amm. phos.	low	low	short	high
Ammonium sulfate	21	ammonium sulfate	low	low	short	high
Urea	46	urea	low	low	short	high
SLOWLY-AVAILABLE N						
Slow-Release Sources						
Sulfur-coated	14-38	urea, ammoniacal N	moderate	moderate	long	low
Resin-coated (ONCE™)	24-35	ammoniacal N, urea, nitrate	moderate	moderate	long	low
Slowly-Soluble Sources						
IBDU	31	IBDU	high	low	long	low
Ureaform Products						
Nitroform	38	ureaformaldehyde	high	high	long	low
FLUF	18	ureaformaldehyde/urea	moderate	moderate	medium	low
Nutralene	40	methylene urea polymers	moderate	low	medium-long	low
Scotts methylene urea	39	methylene urea polymers	moderate	moderate	medium-long	low
CoRoN	28	methylene urea/urea	low	low	medium	low
Formolene Plus	30	methylene urea/urea	low	low	medium	low
N-Sure	28	triazone/urea	low	low	medium	low
Natural Organic Products						
Ringer fertilizers	6-10	blood, bone, seed meals	high	high	long	low
Sustane	6	composted turkey waste	high	high	long	low
Richlawn fertilizers	6-14	DPW, blood & bone meal	high	high	long	low
Milorganite	6	activated sewage sludge	high	high	long	low

Source: The author

more, depending on the source) later in the spring when it becomes warmer. Alternatively, use a mixture of slowly- and quickly- available N when you cannot make frequent spring applications (see sidebar).

Other nutrients

Most often, other nutrients are applied with (or in addition to) regular nitrogen applications. Potassium (K) applications, even when soil tests say levels are adequate, have been touted in recent years as providing an added degree of drought resistance and/or heat tolerance.

Many turf managers believe that they see this effect in the field, although

CLASS GRASS.

Thanks to GSL Sulfate of Potash, this healthy expanse of turf is exhibiting HIGH STRESS RESISTANCE.

Stress is the enemy of quality turfgrass.

Fertilizing with increased levels of potassium builds stress resistance, but all potassium sources are not the same.

From nutrient-rich natural ponds fed by the Great Salt Lake, comes GSL Sulfate of Potash.

It's the perfect source of potassium for turfgrasses. Not only does it contain essential sulfur in its most effective form, but it has the lowest salt index of any potassium source, plus it's practically chloride free.

You can apply the high rate of potassium necessary for resistance to drought, tolerance to cold and wear, stronger roots, and improved nutrient uptake, *without* the risk of "turf burn" a higher salt index can cause.

So, for class grass that stands up to stress, specify GSL Sulfate of Potash.

GSL

The **Natural** Sulfate of Potash Producer
P.O. Box 1190 • Odgen, Utah 84402 • 1-800-453-4515
Great Salt Lake Minerals

NGF NATIONAL GOLF FOUNDATION **SPONSOR MEMBER**

Circle No. 110 on Reader Inquiry Card

In cases of mite damaged turf, recovery can sometimes occur with adequate spring fertilization and watering.

research on the subject has not proven conclusively that supplemental K provides such benefits.

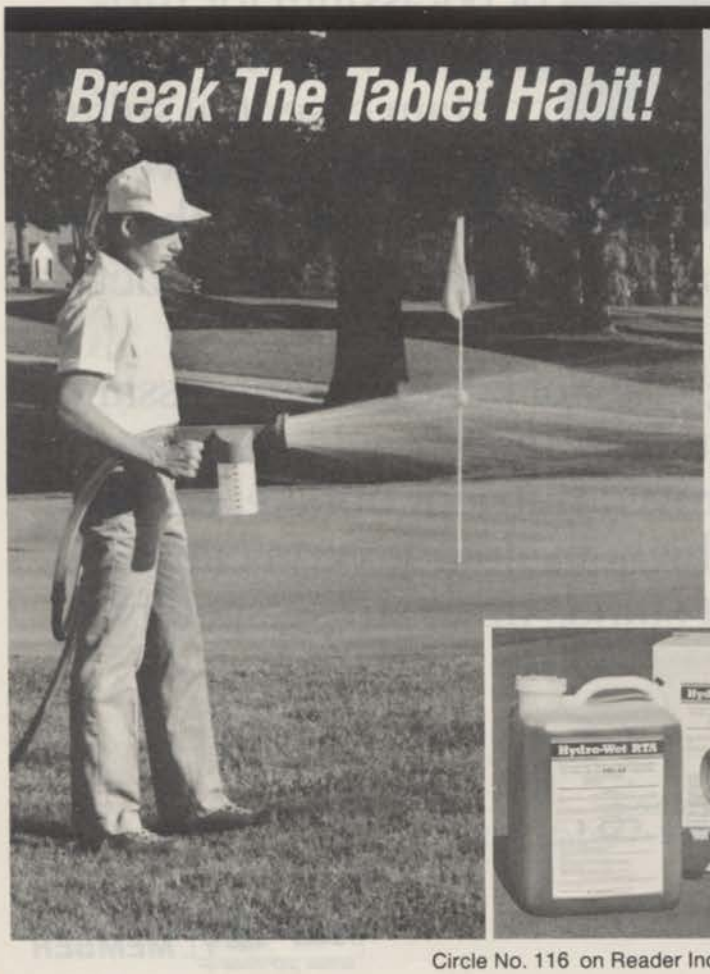
Less has been said about phosphorus (P) in this regard, but many turf managers provide regular supplements of potassium in their programs. It is unlikely that these higher levels of K or P can cause any harm, but one should consider whether any benefit is gained by using high levels of either, especially when one considers the extra cost involved. Routine use of both is encouraged, however, on those sites where grass clippings are regularly removed.

Iron applications can enhance turf color without stimulating excess shoot production. Iron in the spring can be advantageous if it allows you to reduce the amount of N applied. Research by Wehner and Haley at the University of Illinois found that iron can be substituted for a portion of some N fertilizers (urea and Formolene), while still attaining a response equivalent than that obtained from a full rate of nitrogen.

In certain parts of the country where iron chlorosis is prevalent (high pH soils), it may be necessary to apply iron at least once per year. Nitrogen applications to a chlorotic (yellow), iron-deficient turf will worsen the chlorotic condition.

Iron is most effective when applied as a foliar spray. **LM**

Dr. Koski is an assistant professor and extension turfgrass specialist at Colorado State University.



Now you can treat small areas with *Liquid* Hydro-Wet Turf Wetting Agent.

Unlike tablet applicators, the new Pro-Ap delivers ***quick*** and ***accurate*** application.

It's unique. You can adjust rates and apply liquids.

The Pro-Ap is sold with Hydro-Wet RTA, a Ready-To-Apply formulation.

See your Hydro-Wet distributor or call us.

KALO

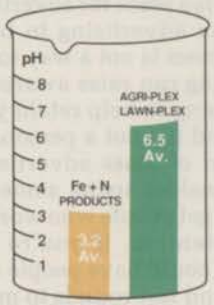
Kalo, Inc. Overland Park, KS 66211
800-255-5196

Circle No. 116 on Reader Inquiry Card

Agri-Plex® and Lawn-Plex® micronutrients solve your tank mix problems.

Turf management professionals around the world are finding that AGRI-PLEX and LAWN-PLEX are the liquid micronutrients formulated to truly *buffer* your tank mix to pH 6.0-7.0.

Don't be misled by other claims about pH. Most liquid micronutrients, especially those containing nitrogen, are formulated at a pH of 2.0-3.0 and, at suggested use rates will lower your tank mix to around 3.0-3.5, even when pesticides are added to the tank. Regardless of the water source, these numbers hold true because, practically speaking, water as well as pesticides do not have the ability to resist change in pH. A rare exception is water that is high in bicarbonates.



AGRI-PLEX and LAWN-PLEX effectively buffer your tank mix to 6.0-7.0.

AGRI-PLEX and LAWN-PLEX provide other benefits since they are *fully chelated* with a patented organic phosphate-citrate chelate. This means you have full tank mix *compatibility* and a longer lasting greenup response without phytotoxicity. Micronutrients containing nitrogen are, at best, only partially chelated and may cause compatibility problems.

AGRI-PLEX and LAWN-PLEX are the micronutrients golf course superintendents and lawn care operators are using. They eliminate problems and provide enhanced results. Now, isn't that a relaxing thought?

Do you want the *FACTS* on pH and micronutrients? See your local RGB Distributor or call us toll free **1-800-879-4766.**

RGB LABORATORIES INC.

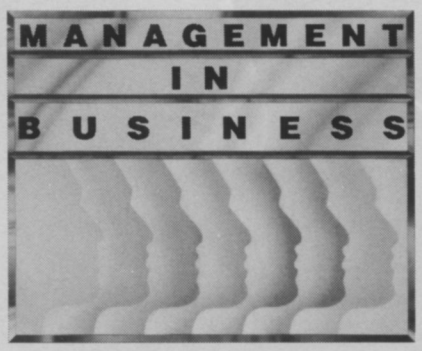
We Specialize in Micronutrients for Turf and Ornamentals

Circle No. 152 on Reader Inquiry Card

SURVIVING IN A TROUBLED ECONOMY II

by Rudd McGary, Ph.D., AGMA, Inc.

Perhaps the most important key to being a stong company in the coming years is marketing: standard practices of past years aren't going to take a company through the '90s. Much of what used to be standard will become old-fashioned and—worse—ineffective. Here are some ideas about the ways in which you need to market to survive in the '90s.



Attract and retain

Most green industry companies have emphasized attracting customers. This is apparent by strong efforts in direct mail and—with larger companies—in television and radio advertising. The idea was to keep on finding new customers year after year, with the suppostition that there was a never-ending supply of them.

Unfortunately for compaies which thought this way, the supply is just about used up. By that I mean that there aren't likely to be many potential customers in major metro markets who are just now finding out about companies for lawn and landscape care, as well as consturction and design. Particularly lawn care, since advertising for this service has been done for at least a decade. This customer base knows that the services are available and generally has an idea about their costs.

What does this mean for survival? Simply that you had better look at retaining your customers and making sure that your growth is predicated on a strong customer base rather than by trying to replace your customers (or at least a large part of them) each year.

Retention vs. attraction

Retention is a good marketing strategy, not only for survival, but for any company looking for strong growth.

One reason is that it costs less than attraction. Depending on your budget for advertising, and on how much you budget for retention efforts, attracting a new customer generally will cost three to six times as much as retaining one. Reason enough here to focus on retention.

But the true survival part of this strategy is linked to the fact that if a satisfied customer tells a potential customer about your services, you're likely to get the business. If you're focusing on retention—making sure that the customer is satisfied—then you're likely to have a strong base of referrals, and growth is likely. Trying the opposite, to attract and not retain, is a sure way to perish.

The personal touch

A second major part of survival strategy deals with how you treat the customer. If you're interested in keeping customers, you need to make sure that you work on keeping in personal touch. That means several things from a marketing standpoint:

Advertising can be useful, but if you focus on retention and the personal touch, you should shift your emphasis to more personal sales. (This doesn't mean you should go more toward telephone sales. That's not a personal sale, it's a phone call.) You should go more toward a trained sales staff that knows how to explain your services to a consumer in a way that will help that consumer make a decision to buy your company's offerings.

There is a place for advertising, but relying on advertising to bring you new business is not a way to survive. Advertising can raise awareness, but it's not going to help retain your customers and it's not a personal touch.

Instead of mass advertising, you might consider using some of your budget to get people who work on customer retention. If you're in lawn care, you could have people call after the first and last rounds to make sure that the customer is satisfied, with both the results of the service and the way in which he or she was treated. If you're in landscaping, you should call after your jobs to make sure that the client was serviced in such a way that he or she is likely to refer you to a new customer.

In addition, you might take some money out of your advertising budget and spend it on the office staff. They're the people who will make the first impression on the public, and also the ones who will deal with problems first as incoming calls occur. By finding ways to compensate the office staff for helping to retain your customers, you can help the entire company focus on retention.

At the same time, making sure that you look for a personal touch rather than mass advertising is likely to give you a group of customers who will help you grow through referral and word of mouth—the two most important ways to grow any type of green industry company.

In short, to survive:

1) Stop thinking about attracting new customers. Simply going after new customers each year isn't a good strategy, particularly in times when the word "survival" is being used. By worrying about how you're going to keep customers (and this includes work quality), consumers become the focus of everything the company does.

In a survival mode, the retaining customers becomes more and more important.

2) Use less mass media and more personal touch. The days of mailing out large amounts of direct mail pieces and getting a decent return are becoming history. You need to have a good sales force and a good retention force, people that can work with the consumers, in order to survive.

For most companies, taking care of the customer was the way to start and grow. In a survival mode, you should look at what the customer wants and make sure to deliver the service so that customers will want to come back or at the very least, give us a good recommendation. People can choose a lot of different companies for their green services. Those companies that give the personal touch are the ones that will survive and prosper. **LM**

LANDSCAPE MANAGEMENT
SERVING GOLF AND LANDSCAPE PROFESSIONALS

LITERATURE ROUNDUP

Spotlighting product literature to the entire Landscape industry.

Get more information on the products you're interested in—simply return the reader service card today. There's no cost and no obligation.

Everyone from the largest contractor to the small landscaper will find a Finn Hydro Seeder® or straw mulcher sized to fit their specific needs. Receive information on the complete line of Finn Equipment and consumable products. Your options, and your profits keep growing.

Finn Corporation
9281 LeSaint Drive
Fairfield, OH 45014
(800) 543-7166
Fax: (513) 874-2914

Circle No. 276 on Reader Inquiry Card

Anti-Wash®-GeoJute® is a highly economical and effective method to establish vegetation on slopes and waterways. It holds mulch and seed in place and completely biodegrades after one year.

Belton Industries
8613 Roswell Rd.
Atlanta, GA 30350
(800) 225-4099
Fax: (404) 992-6361

Circle No. 250 on Reader Inquiry Card

Stimulate Growth and Improves Stress Tolerance
Independent tests have demonstrated that Roots stimulates up to 90% more root growth than ordinary fertilizers alone. With a better root system, your plants can absorb more water and nutrients. They'll become established more quickly, and be more tolerant of stress from heat, drought, insects and disease.

Roots Inc.
25 Science Park
New Haven, CT 06511
Roots is a trademark of
Lisa Products Corp.
(800) 342-6173

Circle No. 268 on Reader Inquiry Card

Pene-Turf—Tough on Turf Problems
Pene-Turf soil treatment, an exclusive product of Four Star Services, Inc., in Bluffton, IN, works deep into the soil and works at the problem of compaction. Pene-Turf improves: soil structure, aeration and root growth, soil drainage; reduces: water run-off, erosion, wet and dry spots.

Pene-Turf is a non-toxic, biodegradable soil treatment and is easy to use. Pene-Turf solves turf problems and solves them quickly and easily.

Four Star Services
PO Box 463
Bluffton, IN 46714
(800) 348-2608

Circle No. 256 on Reader Inquiry Card

WIN™ "Professional Landscaper" Maintenance Products—WIN landscape products are specially formulated with environmentally oriented IBDU® slow release nitrogen to give you superior agronomic results, less clippings, and earlier green-up while reducing the risk of ground water contamination. WIN products are developed and manufactured by PAR EX Specialty Products Division, Vigoro Industries, Inc.

Vigoro Industries, Inc.
Specialty Products Div.
2121 Third St. S.W.
Winterhaven, FL 33880
(813) 293-3147
Fax: (813) 294-3823

Circle No. 273 on Reader Inquiry Card

Encore Manufacturing Company's complete line of commercial turf equipment is featured in this new eight-page, full color PRO-Line brochure, including model descriptions, photographs and specifications on Encore's PRO-Line, PRO-Thatch, Power-Slice and riding sulky and grass catcher accessories. An Important feature highlighted is the PRO mowers' double V band drive belt to eliminate slippage. This brochure is the first to focus on the complete PRO-Line of equipment and accessories. The information and a price quote sheet make a handy reference tool.

Encore Manufacturing Co. Inc.
P.O. Box 888, Beatrice, NE 68310
(402) 228-4255
Fax: (402) 223-4103

Circle No. 254 on Reader Inquiry Card

People with leaf problems have been solving them for years with a Woods leaf mulching Model 80. For more than three decades Woods Model 80's have been mowing and mulching an 80″ swath over golf courses, parks, airports, rights-of-way and more. For tractors rated 30 to 60 h.p. there is the choice of pull-type or 3-point hitch mounted models. And pull-types are available in center-pull or offset.

Woods
Division of Hesston
P.O. Box 1000
Oregon, Illinois 61061

Circle No. 275 on Reader Inquiry Card

Handy pocket-size brochure tells how ORTHENE Turf, Tree & Ornamental spray protects 110 kinds of plants from over 45 different types of insects. ORTHENE is the perfect tool for golf course managers and LCOs who are serious about eliminating serious turf pests.

Valent U.S.A. Corporation
1333 N. California Blvd., Suite 600
P.O. Box 8026
Walnut Creek, CA 94596-8026
(415) 256-2700
Fax: (415) 256-2777

Circle No. 272 on Reader Inquiry Card

Landscapers' Supply Corp. of New York and Tennessee has released its new 1991 catalog. It's filled with over 2500 items of commercial equipment, engines, parts and accessories at wholesale prices. We ship right to your door via UPS. All you have to do is to call us toll-free at 1-800-222-4303 (in NY, call 914-429-8300).

Landscapers' Supply Corp.
1 Bridge St.
P.O. Box 343
Garnerville, NY 10923
(914) 429-8300
Fax: (914) 429-8988

Circle No. 261 on Reader Inquiry Card

CURV-RITE ALUMINUM EDGING offers a unique telescoping design saving time, product and money. The flexible yet durable structure allows smooth, flowing curves or interlocking circles. Curv-rite connectors create simple and precise corners or angles. Available in mill finish, black painted or anodized finish in 1/8″ by 3″ or 4″, 3/16″ x 4″ or 5 1/2″ suitable for planting beds, paving areas, or maintenance strips.

Curv-Rite, Inc.
P.O. Box 2745
Grand Rapids, MI 49501-2745
1-800-FON CURV (1-800-366-2878)
(616) 878-3845
Fax: (616) 878-1302

Circle No. 252 on Reader Inquiry Card

NOR-AM Chemical Company offers a complete line of *professional* products for *professional* results. For additional information contact George J. Raymond, Marketing Manager, NOR-AM Chemical Company.

NOR-AM Chemical Company
P.O. Box 7495
Wilmington, DE 19803

Circle No. 263 on Reader Inquiry Card

For "CLASS GRASS" use Great Salt Minerals Sulfate of Potash. No other potassium source has a higher K_2O content, lower salt index, or lower chloride content. GSL SOP also contains 18% sulfur for optimal turfgrass nutrition. Available in 6 grades.

Great Salt Lake Minerals
6950 W. 56th Street
Mission, KS 66202
(913) 362-6150
Fax: (913) 362-9766

Circle No. 259 on Reader Inquiry Card

Proprietary Seeds, Inc. offers four full-color flyers, each featuring a grass seed formulated for top performance for specific turf requirements: "Crew-Cut" Tall Fescue (dwarf type), "Bonanza" turf-type tall fescue, "Magnum" Brand turf-type perennial ryegrass mixture, and "Vantage" perennial ryegrass.

Proprietary Seeds, Inc.
2882 Howell Prairie Rd NE
Salem, OR 97305
(503) 585-7033
Fax: (503) 585-3273

Circle No. 266 on Reader Inquiry Card

Growth Products is adding to its LIQUID PROFESSIONAL PRODUCTS, MICREL TOTAL, the most complete micronutrient package, with the highest concentration of micronutrients: a *True Solution...* leaves nothing in suspension. Eight essential micronutrients are balanced in the proper ratio to improve plant vigor and correct deficiencies. No mixing or special agitation is needed.

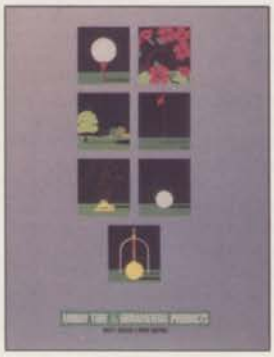
Growth Products
P.O. Box 1259
White Plains, NY 10602
(800) 648-7626
Fax: (914) 428-2780

Circle No. 258 on Reader Inquiry Card

New full-color Grasshopper literature outlines the Gemini 700 Series of six outfront, zero-turn-radius mowers with the exclusive Gemini dual-hydrostatic direct drive, in 18 hp to 25 hp, air-cooled gas and liquid-cooled gas or diesel, powerplants. Deck options from 44" to 72". Year-round attachments.

The Grasshopper Company
P.O. Box 637, One Grasshopper Trail
Moundridge, KS 67107
(316) 345-8621
Fax: (316) 345-2301

Circle No. 257 on Reader Inquiry Card



Mobay Corporation has literature on its full line of turf and ornamental products. Brochures contain technical data and information on handling, application and storage of each product. Mobay manufactures turf and ornamental fungicides, insecticides and herbicides.

Mobay Corporation
Specialty Products Group
P.O. Box 4913
Kansas City, MO 64120
(816) 242-2333
(800) 842-8020

Circle No. 262 on Reader Inquiry Card

Distributor of Professional turf, tree and ornamental products: fertilizers, insecticides, herbicides, fungicides, irons, adjuvants, product/program consulting and other special services.

SPECIAL PRODUCTS
A UAP Company
P.O. Box 78666
Indianapolis, IN 46268
(317) 471-3850
(800) 659-6689

Columbus, OH
(800) 821-0170
(800) 222-9963 (OH)
(614) 759-1133

Circle No. 271 on Reader Inquiry Card

Six different fertilizers for trees. All contain a good balance of slow & fast release nitrogen and all contain iron, copper, manganese, & zinc. These products were designed for hydraulic injection into the soil, in the root zone.

The Dogget Corporation
30 Cherry St.
Lebanon, NJ 08833
(201) 236-6335
Fax: (201) 236-7716

Circle No. 253 on Reader Inquiry Card

Reemay, Inc. offers a 12-page installation brochure and products sample for its Typar® Landscape Fabric. This Fabric is lightweight, tough, permeable spunbonded polypropylene fabric which helps minimize landscaping maintenance by blocking weeds. It allows air, water and liquid nutrients to pass through to plant roots, and is used in landscaping beds, as plant/pot liners, under brick or block patios and walkways, behind retaining walls and under wooden decks.

Reemay Inc.
70 Old Hickory Blvd.
P.O. Box 511
Old Hickory, TN 37138
Fax: (615) 847-7068

Circle No. 267 on Reader Inquiry Card

CoRoN 28-0-0 Controlled Release Nitrogen. This clear liquid fertilizer provides long term release in a non-burning formulation. Suitable for turf, ornamentals, foliar and deep-root feeding of trees and shrubs. Mixes easily with fertilizer materials and other plant protection products.

CoRoN Corporation
P.O. Box 198
Souderton, PA 18964
(800) 338-0836 (215) 723-5099
Fax: (215) 721-2800

Circle No. 251 on Reader Inquiry Card

Enhance your courses' beauty with UNIPAR® silica sands. Chemical purity, pH neutrality and minimal clay and silt guarantee superior performance in bunker construction and soil building. These high quality bunker and soil dressing sands are available throughout the United States and Canada.

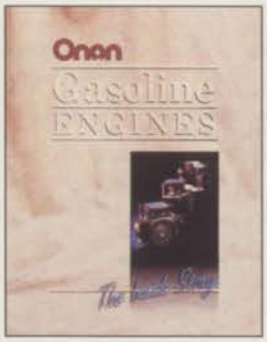
Unimin Corporation
258 Elm Street
New Canaan, CT 06840
(800) 243-9004 US
(800) 554-3347 Canada

Circle No. 277 on Reader Inquiry Card

CORE AERATION AT A FASTER PACE. Triple your profits with the Feldmann Pull Behind Gang System. Pull with approximately 20 HP utility tractor for wider and more comprehensive coverage. Core aeration encourages healthy turf and a subsequent resistance to disease. Increases moisture infiltration and rooting. The 2340-32″ units ganged in three will encompass an area of eight feet. The 2340-48″ ganged together will cover an area of eleven feet, nine inches.

Feldmann Engineering & Manufacturing Co., Inc.
520 Forest Avenue,
Sheboygan Falls, WI 53085-0908
(800) 344-0712

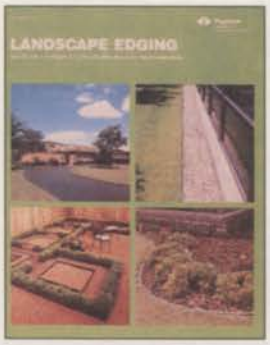
Circle No. 255 on Reader Inquiry Card



This six page color brochure tells "The inside story" about Onan's 16-24 horsepower "Performer" engine series. It features component photos together with detailed descriptions of features and benefits. A table of specifications and list of standards and optional features is also included.

Onan Corporation
1400 73rd Ave. NE
Minneapolis, MN 55432
(612) 574-5000
Fax: (612) 574-8289

Circle No. 264 on Reader Inquiry Card



RYERSON STEEL LANDSCAPE EDGING brings permanence and definition to your designs. Retains crushed rock or gravel. Reduces edge erosion of asphalt drives. Separates lawns and ground cover from other medium. Quick, easy installation. Bulletin includes plastic edging for free-form designs.

Joseph T. Ryerson & Son, Inc.
P.O. Box 8000
Chicago, IL 60680
(312) 762-2121
Fax: (312) 762-6317

Circle No. 269 on Reader Inquiry Card

PERMALOC ALUMINUM EDGING is a heavy gauge permanent landscape edging offering easy installation, low maintenance and lasting beauty. If you are tired of edging products that do not meet your longterm expectations, allow Permaloc to perform for you just as it has for Epcot, SeaWorld and others. Available finishes include mill, black dura-flex (painted) and black anodized. PERMALOC is available in 1/8″ or 3/16″ thickness by 4″ and 5 1/2″ depths.

PermaLoc Corporation
13505 Barry Street
Holland, MI 49424
(800) 356-9660
Fax: (616) 399-9770

Circle No. 265 on Reader Inquiry Card

SDI offers over 80 models from 50 thru 1000 gallon size, featuring custom molded fiberglass tanks, exclusive self lubricating mechanical agitator, and various pump and power options to cover most spray applications.

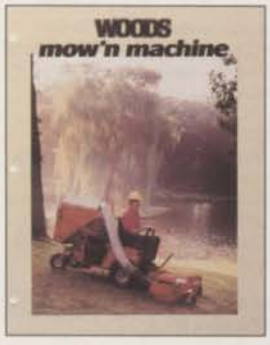
Spraying Devices, Inc.
P.O. Box 3107
Visalia, CA 93278-3107
(209) 651-1306
Fax: (209) 651-5024

Circle No. 270 on Reader Inquiry Card

GreenGraphics® Green Permanent Turf Colorant-this water-based modified acrylic coating significantly improves visual appearance of all turfgrass types, holds its color, decreases incidence of cuticle breakdown, and will normally require only one seasonal coating. Non-toxic, non-phytotoxic. Since 1972. Call 1-800-544-8523.

Green Graphics
1101 Montclaire NE
Albuquerque, NM 87110
(800) 544-8523
(505) 898-4595

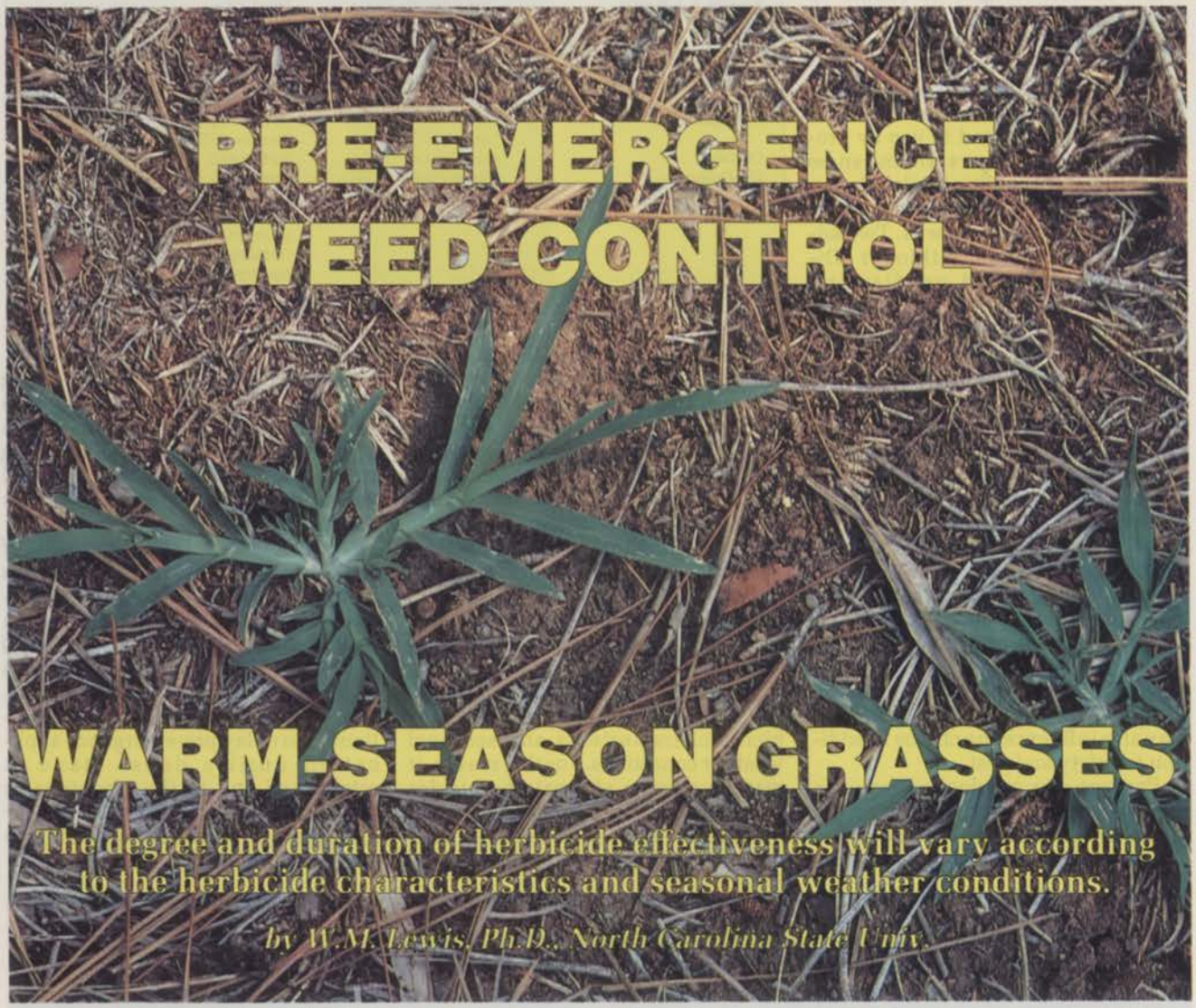
Circle No. 260 on Reader Inquiry Card



Woods '91 mow'n machines are available in seven tractor models, and five sizes of mower decks. Attachments include three Vac models, snowblower, dozer blade, "Sweepster" brush and roll-over-protection (ROPS). Twelve page brochure including complete specifications is now available from Woods.

Hesston Corporation
Woods Division
P.O. Box 1000
Oregon, IL 61061-1000
(815) 732-2141

Circle No. 274 on Reader Inquiry Card



PRE-EMERGENCE WEED CONTROL

WARM-SEASON GRASSES

The degree and duration of herbicide effectiveness will vary according to the herbicide characteristics and seasonal weather conditions.

by W.M. Lewis, Ph.D., North Carolina State Univ.

Goosegrass and smooth crabgrass (shown above) are two of the most common weeds found in warm-season turfgrasses. Specific management practices lead to aesthetically appealing turfgrasses.

The first step in a weed management program is to produce a healthy vigorous turf, one competitive with weeds. This may be done by matching proper warm-season turfgrass species or cultivars with their intended use—whether a home lawn, athletic field, commercial landscape or golf course fairway.

Grass selection may also be related to its intended level of management (amount and frequency of fertilization, needed irrigation and mowing height and frequency).

Insect and disease problems should also be reduced.

Once these practices have been put into action, the turf manager is ready to consider the need for pre-emergence herbicides.

Frequently, the need should be determined by observations made on the site the previous season. Applying pre-emergence herbicides year after year without any consideration to the existing weed problems is not good management. Carefully selecting specific management practices leads to an aesthetically appealing and serviceable warm-season turfgrass.

Available herbicides

Pre-emergence herbicides are the

backbone of a weed management program. They are primarily used for the control of smooth and large crabgrass and goosegrass, though many will control certain other summer annual weedy grasses. Also, they provide pre-emergence control of annual bluegrass when applied in the fall.

A number of herbicides or herbicide combinations are registered for pre-emergence use in established warm-season turfgrasses (Table 1). This listing contains examples of common and trade names of pre-emergence products.

Many herbicides are also formulated on fertilizer carriers. Certain herbicides are limited to use by professional turf managers which can be determined by reading the label.

Oxadiazon (Ronstar) is not registered for use on home lawns. Two additional herbicides, dithiopyr (Dimension 1EC) and prodiamine (Barricade 65 WDG) may be registered for use in the 1991 season.

The emphasis is on application to established turfgrass because none of the herbicides are registered for application at time of sprigging, sodding or seeding warm-season turfgrasses. There is one exception, however: siduron may be used when sprigging zoysiagrass.

Herbicide selection

When selecting a herbicide, first consider turfgrass tolerance (Table 2) and the grassy weeds present on the site. Then consider the effectiveness of the herbicides on those weeds (Table 3). The method or ease of application may also influence the choice in addition to safety and cost.

Perhaps one overlooked factor is the tolerance of trees and ornamentals in the landscape. Most labels list tolerant ornamental species. This opens up another possibility of selecting a single herbicide for pre-emergence grassy weed control in the turf as well as the ornamental plant beds.

With the exception of atrazine, simazine and oxadiazon, the effects of the pre-emergence herbicides are associated with inhibiting root growth in the germinating weed seeds. Root inhibition has also been observed in desired turfgrasses; for example, in the growth of new roots along the stolons of bermudagrass and centipedegrass.

The degree and duration of the effects will vary according to the herbicide characteristics and seasonal weather conditions. For this reason, it may be wise to alternate herbicides from year to year or—maybe even more important—to be very cautious in determining the need for a pre-emergence herbicide in any year.

In heavily-trafficked areas having thin open stands, a pre-emergence herbicide may interfere with the stand filling in and the stolons rooting properly. Post-emergence control would be the best approach for this situation.

Frequent light applications of MSMA may be used in bermudagrass in an effort to control recently germinated crabgrass and goosegrass. In centipedegrass, sethoxydim (Poast) applied as a post-emergence provides control to crabgrass and goosegrass. The other alternative in these situations is to delay pre-emergence application until a dense stand is established and in the meantime to concentrate on starting the proper management practices to encourage that dense stand.

Table 1.

Examples of Common and Trade Names of Pre-emergence Herbicides for Warm-Season Turfgrasses

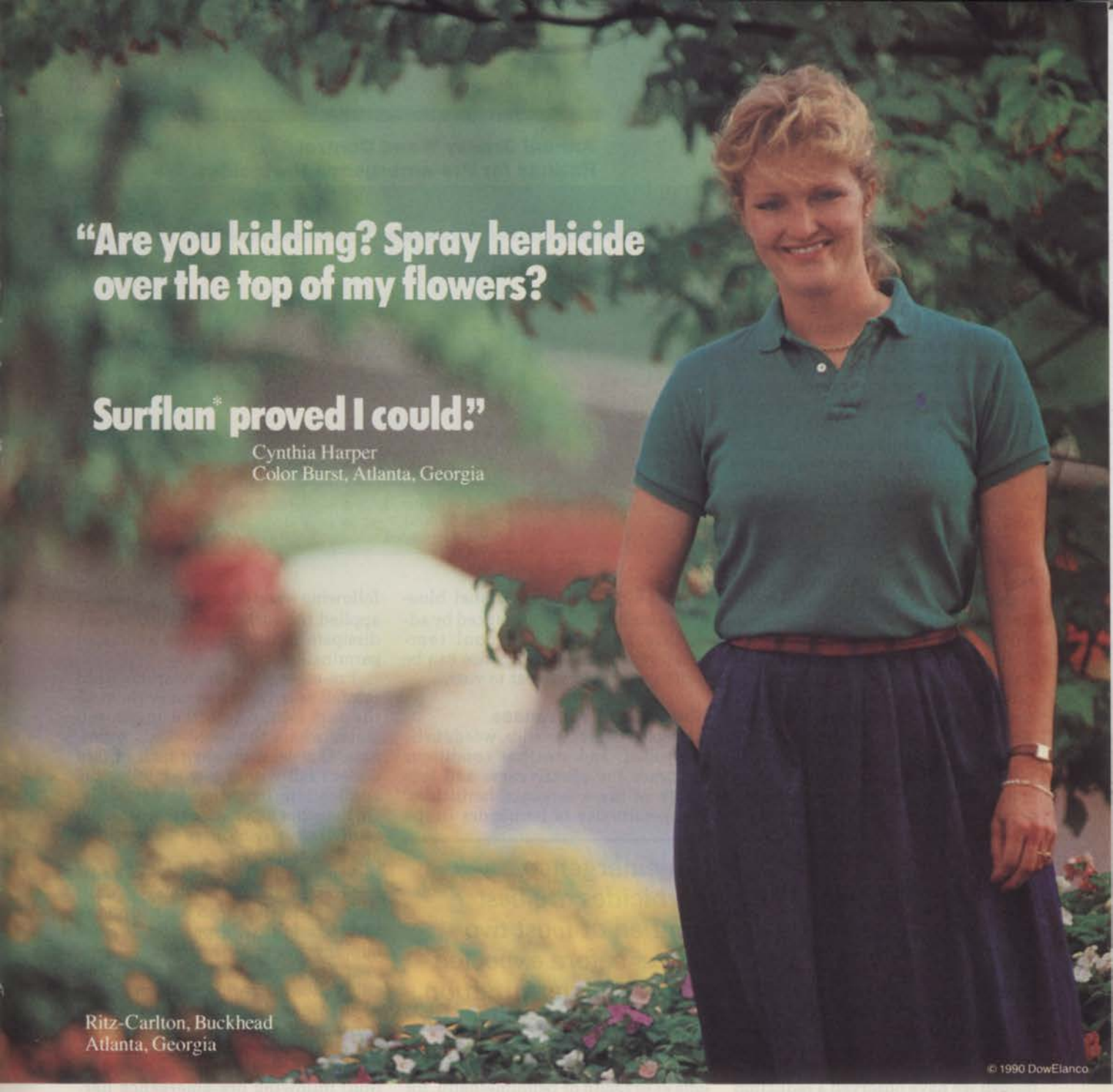
Common Name	Company	Trade Name and Formulation
Atrazine	Ciba-Geigy	AAtrex 80W, 4L, 90DG
	Security	Purge II 2L
Benefin	Dow/Elanco	Balan 2.5G, 60DF
	Lesco	2.5 Benefin Granular
Benefin + oryzalin	Dow/Elanco	XL 2G
Benefin + trifluralin	Dow/Elanco	Team 2G
Bensulide	ICI	Betasan 4E LF, 3.6G, 7G, 12.5G
	Lesco	Lescosan 4E, 7G
	PBI/Gordon	Bensumex 4LF
Bensulide + oxadiazon	Scotts	Goosegrass/Crabgrass Control 6.5G
DCPA	Fermenta	Dacthal 75W, 6F
Napropamide	ICI	Devrinol 50WP, 2G, 5G
	Lesco	Devrionol 5G Ornamental
Oryzalin	Dow/Elanco	Surflan 4AS
Oxadiazon	Rhone-Poulenc	Ronstar 2G, 50WP
Pendimethalin	Lesco	Pre-M 60 DG
	Scotts	Halts 1.71G
		Southern Weedgrass Control 2.45G
		Turf Weedgrass Control 1.71G
		Weedgrass Control 60WDG
Simazine	Ciba-Geigy	Princep 80W, 4L, 90DG, 4G

Table 2.

Tolerance of Established Warm-Season Turfgrasses to Pre-emergence Herbicides for Control of Annual Weedy Grasses

Herbicide	Bahiagrass	Bermudagrass	Centipedegrass	St. Augustinegrass	Zoysiagrass
Atrazine	NR	T	T	T	T
Benefin	T	T	T	T	T
Benefin + oryzalin	T	T	T	T	T
Benefin + trifluralin	T	T	T	T	T
Bensulide	T	T	T	T	T
Bensulide + oxadiazon	NR	T	NR	NR	T
DCPA	T	T	T	T	T
Napropamide	T	T	T	T	NR
Oryzalin	T	T	T	T	T
Oxadiazon	NR	T	NR	T	T
Pendimethalin	T	T	T	T	T
Siduron	NR	NR	NR	NR	T
Simazine	NR	T	T	T	T

T = tolerant when used properly according to the label; NR = not registered for use on this turfgrass.


"Are you kidding? Spray herbicide over the top of my flowers?
Surflan* proved I could."
Cynthia Harper
Color Burst, Atlanta, Georgia
Ritz-Carlton, Buckhead
Atlanta, Georgia
© 1990 DowElanco

"I was hesitant to try it at first. I thought, surely, there would be some injury to my flowers. But Surflan herbicide convinced me otherwise. It didn't harm them at all when we sprayed directly over the top.

"Surflan wasn't so gentle to the weeds. We used to have a real problem with crabgrass and foxtails. We'd have to go in and pull them all by hand. It was so time-consuming. I figured I was paying close to $50 for each thousand square feet just for labor.

"But with Surflan, the job took only minutes. And cost me less than $1.50 for what used to cost me almost $50.

"Surflan also took care of our oxalis and chickweed. And many other problem weeds, too. For almost eight months."

Prove Surflan for yourself. Get full details in our free technical guide on Surflan. Just call toll-free: **1-800-729-3693, ext. 7612.**

DowElanco™

*Trademark of DowElanco

Circle No. 108 on Reader Inquiry Card

Application timing

Pre-emergence herbicides are best applied at least two weeks before expected weed seed germination. In areas where there is a crabgrass history, pre-emergence herbicides are applied in the spring when soil temperatures approach 53°F. Goosegrass germination is usually two weeks later than crabgrass.

Crabgrass and goosegrass germinate first in thin open stands of warm-season turfgrasses. Germination is delayed and/or reduced in dense stands, which is another reason for considering all cultural practices as part of a total weed management program. Moving from the southern to the northern portion of the warm-season zone, crabgrass may germinate from late January to early April.

Frequently, application timing is correlated with a biological indicator. For example, in North Carolina, pre-emergence crabgrass herbicides should be applied by the time dogwoods are in full bloom.

Research at North Carolina State University has shown that split applications generally out-perform a single pre-emergence application. An example of a split rate may be 1.5 pounds in early spring and 1.5 pounds eight weeks later, if the usual single spring application rate is 3 pounds active per acre. Split applications of benefin + trifluralin, oryzalin and pendamethalin have given acceptable goosegrass control.

Some turf managers apply one pre-emergence herbicide early in the spring and a second herbicide eight weeks later in an attempt to increase safety to the turf. We have not observed any adverse effects on ryegrass mixtures overseeded in bermudagrass in September or October following a March-to-May pre-emergence herbicide application, though we have observed a reduction in stand density of fall overseeded ryegrass from spring applications of oryzalin and benefin + oryzalin.

Our tests have also shown that applications can begin six to eight weeks before expected crabgrass germination with favorable control, because under cool soil temperatures little if any herbicide degradation occurs during this period. This would not hold true farther south in the warm-season turfgrass area. In fact, in some areas crabgrass can germinate year-round under favorable conditions.

Applications of herbicides for pre-emergence control of annual bluegrass and certain winter annual broadleaf weeds may be from late August to early November, depending on geographical location. Annual bluegrass germination is influenced by adequate moisture and cool temperatures. Time of emergence can be quite variable from year to year.

TABLE 3.

Annual Grassy Weed Control Ratings for Pre-emergence Herbicides

Herbicide	Crabgrass	Goosegrass	Annual Bluegrass
Atrazine	P	P	E
Benefin	G	F	G
Benefin + oryzalin	G	F-G	G
Benefin + trifluralin	G	F	G
Bensulide	G	P	G
Bensulide + oxadiazon	G	G	G
DCPA	G	F	G
Napropamide	G	G	G
Oryzalin	G-E	G	G
Oxadiazon	G	G	G
Pendimethalin	G-E	F-G	G
Siduron	G	F	NR
Simazine	P	P	E

Weed control effectiveness: E = excellent (90-100%), G = good (80-90%). F = fair (70-80%), P = poor (<70%), NR = not registered.

Herbicide effectiveness

Herbicide characteristics, weeds to be controlled, and weather conditions influence the effectiveness and longevity of pre-emergence herbicides. The persistence of herbicides in the soil differs. Benefin does not persist as long as oryzalin or pendimethalin, for example. Split or repeat herbicide applications help to maintain threshold levels for season-long grassy weed control.

Pre-emergence herbicides are best applied at least two weeks before expected weed seed germination.

As indicated in Table 3, with the exception of atrazine and simazine, pre-emergence herbicides provide good to excellent control of crabgrass. However, the ability to control goosegrass varies. For effective goosegrass control, a herbicide rated "good" should be applied. Single applications of oxadiazon and bensulide + oxadiazon have provided favorable goosegrass control in North Carolina tests.

If a pre-emergence herbicide is to be effective, it must be applied prior to weed seed germination. Applications following weed emergence will fail. If applied too early, the herbicide may dissipate or degrade before weed seed germination.

Pre-emergence applications need rainfall or irrigation to move them off the turf foliage into the upper soil layers where the weed seeds germinate. If at least one-half inch of rain doesn't fall within a week following application, irrigation is advisable. On the other hand, excessive seasonal rainfall usually reduces the length of effective control.

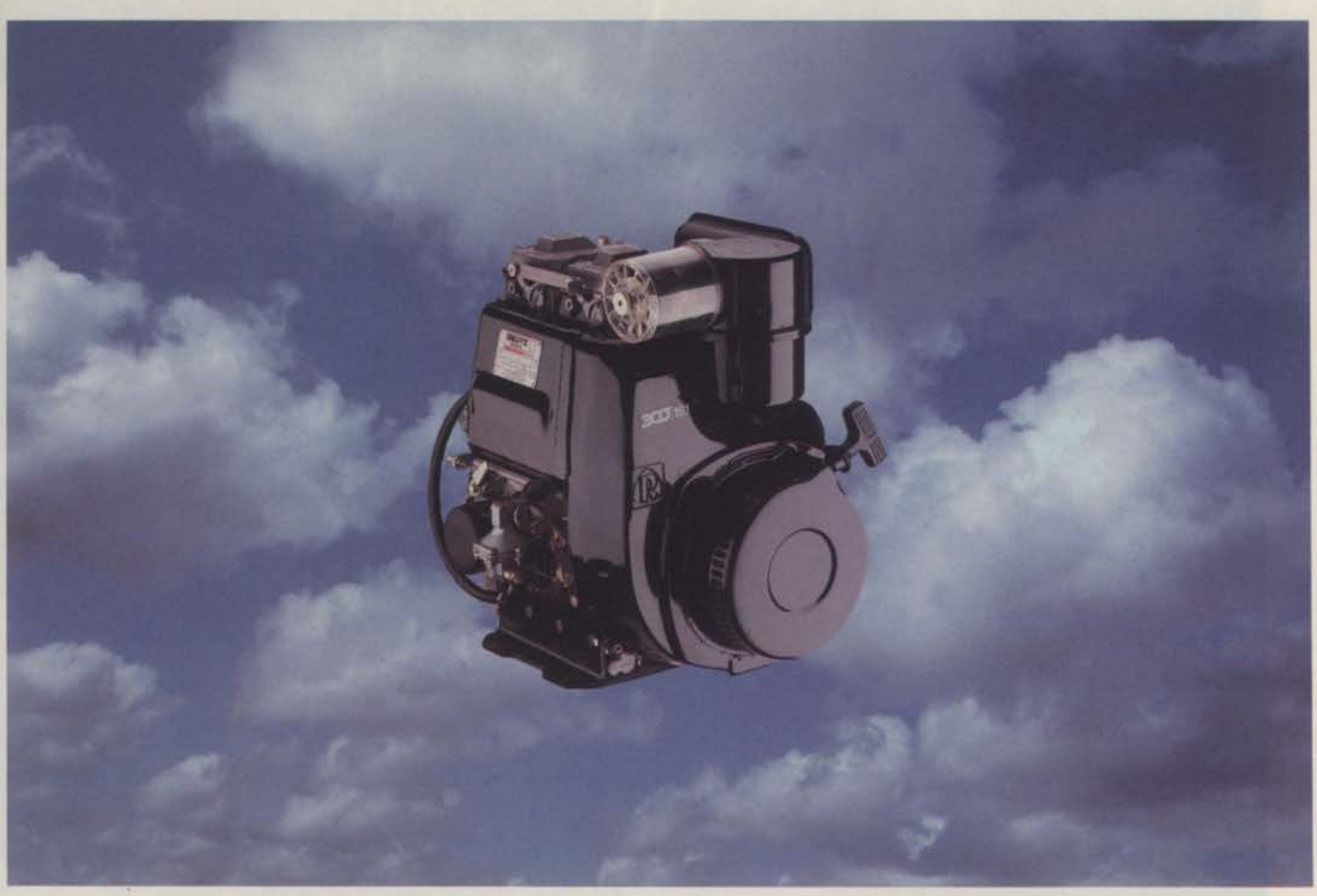
Mowings of warm-season turfgrasses should be delayed until the herbicide has been washed off the turfgrass foliage, especially if grass clippings are to be removed.

It has been a common belief that cultivation following pre-emergence appications disrupts the herbicide barrier in the soil and then stimulates weed germination. However, according to test results, coreing (aerification) following pre-emergence herbicide application does not affect herbicide performance, providing the soil cores are returned.

Metolachlor (Pennant 7.8E) has been registered for pre-emergence yellow nutsedge control on golf fairways, sod farms and commercial lawns, but not on residential turf. It may be applied to bahiagrass, bermudagrass, centipedegrass and St. Augustinegrass.

Choosing the appropriate pre-emergence herbicide requires knowing the tolerance of the warm-season turfgrass to the herbicide.This must be matched with the weeds. **LM**

Dr. Lewis is a professor of crop science at North Carolina State University



Deutz Light. Less Weight. Works Great.

The new small engines from Deutz take off the pounds and pour on the power. These modern, air-cooled diesels come in 1-and 2-cylinder sizes rated from 4 - 28 hp.

The MD and RD Series deliver quiet, hard-working performance in a sleek, compact package, and they offer big-engine features like direct injection, pressure lubrication, and hardened steel crankshafts.

Because of their compact size and light weight, they fit right in where gasoline engines typically have been used. They're ideal for use in small, hard-working equipment, providing diesel engine durability and economical operation in every application.

And they're backed by Deutz, with parts, and service support available through more than 600 dealers and distributors in North America.

The new MD and RD Series air-cooled diesel engines from Deutz. Light in weight, heavy on performance.

DEUTZ
RUGGERINI

Deutz Corporation
3883 Steve Reynolds Boulevard
Norcross, Georgia 30093
(404) 564-7100
Fax: (404) 564-7222

KHD Canada, Inc.
4420 Garand Street
Ville St. Laurent
Quebec, Canada H4R 2A3
(514) 335-3150 Fax: (514) 332-4173

Circle No. 107 on Reader Inquiry Card

Control insects and mites without disturbing homeowners.

Mavrik® is gentle on birds, bees and other beneficials. In fact, no other broadspectrum insecticide is gentler.

Mavrik is also non-restricted, effective at low rates, and non-phytotoxic. There isn't even an offensive odor to alarm neighbors.

So when you control insects and mites with Mavrik, you can rest easy. And so can the neighborhood.

MAVRIK

Insecticide/Miticide

SANDOZ CROP PROTECTION

Use pesticides effectively. Read and follow label directions carefully.
Mavrik is a registered trademark of Sandoz, Ltd.
© 1991 Sandoz Crop Protection Corporation.

Circle No. 137 on Reader Inquiry Card

PRE-EMERGENCE WEED CONTROL

COOL-SEASON GRASSES

Annual weed control requires a sound knowledge of the grasses and weeds in question, and discriminating cultural practices.

by Nick Christians, Ph.D., Iowa State University

Many of the annual weeds we encounter in cool-season turf species are actually warm-season grasses.

Unlike the cool-season turfgrasses that thrive in spring and fall, warm-season grasses such as crabgrass, goosegrass and foxtail thrive during the summer.

Warm-season annuals die early in the fall with the first cool weather. Cool-season grasses thrive in the fall and early spring. Fertilizer applications at this time will help thicken cool-season lawns and make them more resistent to annual weed encroachment in the late spring. Fertilizer applications during mid-June to mid-August to lawns with some annual grasses and broadleaf weeds don't encourage the lawn grasses but do benefit the warm-season weeds.

High-phosphorus diet

The proper fertilizer can also help discourage annual weeds.

When the lawn is established, "starter" fertilizers high in phosphorus (P) are used, such as a 13-25-6 or a 10-20-10. Once the grass plant matures and forms an extensive root system, however, it is able to remove phosphorus from the surrounding soil; then fertilizers with analysis much lower in P are generally sufficient (i.e., 20-3-15 or 18-5-9).

Application timing

Fertilizing mature lawns with high phosphorus fertilizers does little to benefit the turf, unless the area is shown by a soil test to be low in that element. Germinating annual weeds thrive on high P fertilizers just as do germinating perennial grass seedlings.

Although turf deficient in P may benefit from "winterizing" treatments, most lawns have sufficient phosphorus in the soil. So more will not improve the turf's winter survival; however, the resulting high P levels on the soil surface will help germinating weed seeds in the spring.

Importance of mowing

Mowing itself can serve as a weed control. Many of the serious agricultural weeds are of no consequence in turf areas because they cannot tolerate continuous mowing. Excessively low mowing heights, however, will reduce the turf's competitive advantage and allow annual weeds to become established regardless of whether herbicides are used, as oserved at Iowa State University in late summer studies. (Kentucky bluegrass mowed below 1½ inch will often become infested with crabgrass, regardless of the presence of pre-emergence herbicides.)

A good dense stand of turf is one of the best weed controls, and mowing to meet the turf's requirements is one of the best ways to assure a dense stand.

Cultural practices

Cultivation techniques such as core aerification can work both ways on weed infestation.

Compacted soils have a detrimental effect on the turf and often become infested with annual weeds. Using herbicides on compacted areas makes little sense, unless the compaction problem is dealt with first. Aerification reduces compaction and favors the turf, thereby helping to control weeds.

Improperly timed cultivation can potentially aid weed infestation. Any practice that opens the turf and brings annual weed seed to the surface during the peak weed germination period is likely to benefit the weeds more

than it does the turf.

Recent research has shown that spring aerification following pre-emergence herbicide application does not disrupt the barrier established by the herbicide as much as once believed. It makes good sense, though, to avoid this time if possible. Late summer to early fall is still the best time to aerify cool-season lawns.

Irrigation strategies

A sound knowledge of grass species and weeds can also be used to design an irrigation strategy that will help prevent weeds.

In an established, well-rooted lawn it makes little sense to irrigate to keep the surface continuously moist during the germination of annual weeds. Some surface drying will generally have no detrimental effect on perennial lawn grasses, but will have an impact on newly-germinated weed seed that are struggling to survive.

Turf infested with fungal patch diseases may benefit from light, frequent watering before and during disease activity. Proper use and timing of light, frequent watering programs is recommended on lawns where patch diseases have been a problem. On lawns where patch diseases have not historically been a problem, deep, infrequent watering is still the best practice.

Proper irrigation at other times can also help prevent weed problems. Kentucky bluegrass lawns can survive extended drought periods by going into summer dormancy. But spurge and oxalis often infest these lawns in late summer resulting in callbacks and the need for more herbicides. Using irrigation water to keep the lawn growing can help insure against these weed problems.

Watering cool-season lawns during dry fall conditions can also be a sound management practice.

Dry autumns have been a problem in the Midwest during three of the last four years. This is one of the best times for cool-season grasses to become re-established in the absence of competing annual weeds. This time of year is particularly important on lawns damaged by summer drought.

Proper fall fertilization and watering can help make the lawn more resistant to weed infestation in the spring.

Easy on perennials

Using cultural techniques can help prevent a weed problem. However, cultural controls are rarely 100 percent effective.

Insect and disease damage, adverse weather conditions, physical damage to the lawn, and a variety of other factors can injure even the best managed turf and open it to weed establishment. For these situations, herbicides can prevent weed infestation if properly used.

Table 1 lists a variety of pre-emergence herbicides that can be used on cool-season lawns to help prevent annual weeds. The activity of these materials is such that they do little, if any, damage to the perennial grasses in the turf, but are deadly to the germinating annuals.

(For a detailed discussion of these herbicides, see, "Cool-season weed control poses special challenge," *Lawn Care Industry* magazine, Feb., 1990.)

Some of the materials in this group have unique characteristics.

Siduron, for instance, is the only material in the group that can control annual weeds selectively at the time of lawn establishment. This material is particularly useful for spring seedings.

Isoxaben is marketed under the trade name Gallery. It is particularly effective against knotweed, spurge, oxalis and other annual broadleaf weeds. Isoxaben has limited activity at labeled rates against annual grasses and will generally fit into the lawn care program as a supplement to standard pre-emergence herbicides. Where annual broadleaves have been a problem in the past, this material provides a new tool that can be used effectively if properly timed.

Widening the window

Much of the research on annual weed control in the 1980s was aimed at "widening the window" of application (Figure 1).

The pre-emergence herbicides in Table 1 will control annual weeds if applied before weed germination, but most provide little if any post-emergence activity on weeds that have already germinated. These materials are very useful in situations where they can be properly timed before weeds germinate.

A breakthrough

In the early 1980s, MSMA (monosodium methanearsonate) and DSMA (disodium methanearsonate) were the only materials available for post-emergence control of summer annual weeds in turf. The weed control from these materials was quite inconsistent in much of the Northern region and often resulted in phytotoxicity to the turf. Pre-emergence applications were far preferable during this time, and these post-emergence materials were used only as a last resort.

Fenoxaprop-ethyl, marketed under the trade name Acclaim, was released in the mid-1980s. It was the first really effective post-emergence herbicide for controlling annual grasses in cool-season lawns.

This material broadens the window of application by allowing lawn care specialists to effectively treat germinated crabgrass in its early stages. Customers whose lawns could not be treated before crabgrass germination and customers who signed up for the service after the time of pre-emergence application no longer had to go

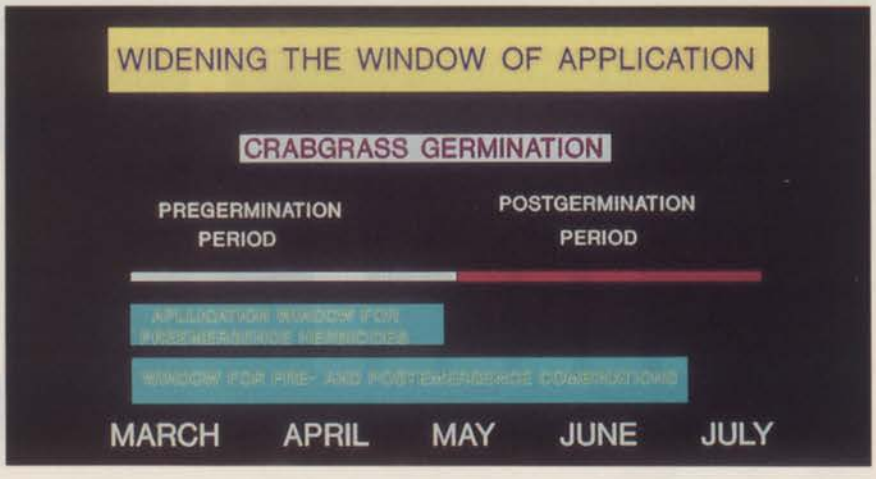
TABLE 1

Pre-emergence herbicides currently in use in cool-season turf

COMMON NAME	TRADE NAME	COMMON NAME	TRADE NAME
DCPA	DACTHAL	OXADIAZON	RONSTAR
BENEFIN	BALAN	PENDIMETHALIN	PRE-M, WEED GRASS CONTROL
BENSULIDE	BETAMEC-4, PRE-SAN, BETASAN	TRIFLURALIN/BENEFIN	TEAM
		SIDURON	TUPERSAN
ISOXABEN	GALLERY		

Source: The author

FIGURE 1



through the entire season with a lawn filled with warm-season annuals.

Fenoxaprop-ethyl has had some limitations. It is incompatable with many broadleaf herbicides such as 2,4-D. It has no pre-emergence activity, and it is not very effective following drought stress of the target species. But it has still been widely used in the cool-season region. **LM**

Dr. Christians is a professor of horticulture at Iowa State University.

New pre-emergence herbicides are becoming available which "widen the window" of time for effective applications.

New control products

DIMENSION: Dithiopyr is a new material that will be marketed on a limited basis in selected states in 1991 under the name Dimension. Research on this product has been under way at various state universities since the mid-1980s under the experimental name MON 15100.

Dithiopyr is a very effective pre-emergence herbicide that provides reasonably good post-emergence control of germinated crabgrass. The extent of the post-emergence activity varies with location, but I have found it to provide excellent post-emergence control in most years at the Iowa State University turfgrass research area.

Dithiopyr has two important advantages over older products:

- it can provide both pre- and post-emergence activity, and
- it does so at a lower rate of application than most herbicides. The recommended application rate will be 0.5 lbs. AI/acre as compared to 1.5 to as high as 10 lbs. AI/acre with earlier materials.

QUINCLORAC: Quinclorac, an experimental product that has been given the potential trade name Impact is another of the new products that may possibly widen the window of application.

This material provides excellent post-emergence control of crabgrass in its early stages and provides excellent control of some broadleaf weeds, particularly white clover. Quinclorac, with little pre-emergence activity, would have to be combined with a pre-emergence material if it is applied at a time when crabgrass is still germinating.

Quinclorac has been found in recent experimental work to provide very good activity in the granular form and may well find a place in the future.

Similar problems during drought

Research at Iowa State University on both dithiopyr and quinclorac indicate that these products are likely to experience problems controlling crabgrass that has been subjected to drought periods. Fenoxaprop-ethyl has similar problems.

Figures 2 and 3 show the results of post-emergence weed control studies following an extended drought period (Fig. 2) and following a period in which no drought stress was observed (Fig. 3). Crabgrass subjected to dry conditions before treatment was much harder to control than the crabgrass that experienced no drought conditions. More work will be needed to understand this reduced control, but this should be considered whenever post-emergence crabgrass control is needed.

Changing standards

With the new tools being developed, the potential exists for a change in the standard lawn care program.

In the past, a standard program included a pre-emergence application in the first round, often followed by an additional application in the second round to assure complete control through the season. With the new post-emergence materials being developed, the possibility exists that the early pre-emergence application could be eliminated and replaced with a single application in the second round that would control annuals both before and after emergence.

The new products will have to prove themselves in the market place, but if this type of program can be used effectively, it could potentially reduce the amount of herbicides that the industry now applies to lawns and could reduce cost. These possibilities will be worth investigating in future seasons as new herbicides reach the market.

—Dr. Christians□

FIGURE 2

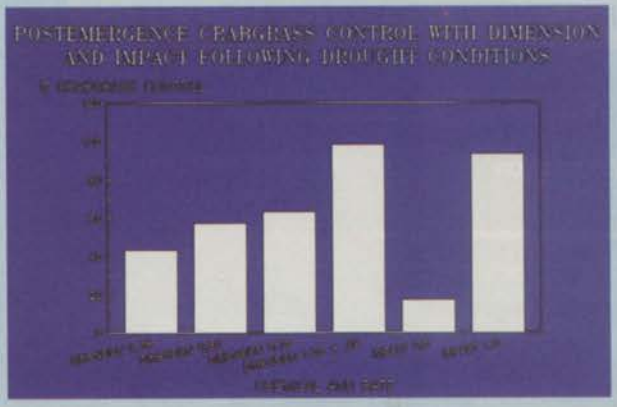


FIGURE 3

New Vantage Gets The Beasts Without Getting The Beauties.

Your grass problem doesn't have to be a frightening story. Because new Vantage™ herbicide selectively controls grass even among your most fragile ornamentals.

You can apply Vantage over the top during almost any stage of your ornamental growth, eliminating the need for costly and time-consuming hand weeding. And with Vantage, there's no worry of leaching.

Use Vantage on your ornamentals, and you'll see how it'll bring your grass problem to a happy ending. If you have any questions, please call us at 1-800-878-8060.

BASF

Vantage is a trademark of BASF Corporation. © 1991 BASF Corporation. Always read and follow label directions.

This Time, We Did
Competition, We Out

To make a dramatic turnaround in your productivity, put yourself behind the wheel of the machine that outmaneuvered them all: The new Groundsmaster® 220-D or the new gas-powered 224 from Toro. No other out-front rotary mowers are as maneuverable, as effortless to operate or provide as much trim productivity.

Fourlink power steering is your link to unmatched maneuverability. Now operators can make sharper, easier turns with less fatigue. This makes trimming around any obstacle quick and almost effortless.

To give you even more cutting control, Groundsmasters feature a single knob deck-to-tractor weight transfer system. A twist of the wrist is all it takes to balance cutting unit flotation to height of cut and traction needs. The result is better traction and better flotation without scalping.

When it comes to engine size, Toro gives you the power of choice. The new Groundsmaster 220-D features a 20 hp liquid-cooled, 3-cylinder Mitsubishi diesel engine. The new Groundsmaster 224 gives you the same engine in a gas model, providing you with the durability diesels are known for, but with more power. Both give you all the speed and power needed for the most demanding jobs.

The Groundsmaster 220 also is available with a 20 hp air-cooled gas engine.

"Toro" and "Groundsmaster" are registered trademarks of The Toro Company. ©1988 The Toro Company.

n't Overpower The maneuvered Them.

A small, compact wheelbase provides a small uncut trim circle and tight turn-around enabling you to trim close around any obstacle. Just what you need to get into or out of tight areas.

With all these performance features, it's obvious why the new Groundsmaster 220-D and 224 are so popular. And why Toro is the leader in out-front riding rotary mowers. To request a demonstration, call your local Toro distributor or contact Toro at the address below.

TORO

The Professionals That Keep You Cutting.

A patented, heavy-duty carrier frame with floating cutting decks allow the cutting units to follow ground contours for a superb quality of cut. For added cutting control, there are three decks to choose from: 72", 62" or 52". And the 52" is available with an optional grass collection system.

The Toro Company, Commercial Marketing Services, 8111 Lyndale Ave. So., Minneapolis, MN 55420.

Circle No. 144 on Reader Inquiry Card

PGRs: LESS TIME, FEWER CLIPPINGS

Yard waste restrictions and busy mowing schedules persuade companies to add plant growth regulators to their arsenals.

by Doug Oberman, PBI/Gordon, Kansas City, Mo.

Proof of the way science benefits industry can be found in the renewed interest in plant growth regulators (PGRs) for reducing yard waste and mowing time.

Using PGRs on fine turf runs contrary to the conservative attitude of the turfgrass professional: that quality turf depends on how rapidly and vigorously the grass grows. But the reality of landfill depletion has changed many attitudes.

"As clipping management and yard waste becomes a bigger problem, we see a larger opportunity for PGRs, especially when they are used to complement controlled release nitrogen (N) feedings," says Dr. Milt Kageyama, director of product development at O.M. Scott & Sons. Scott's regulator product, TGR Poa Annua Control, is described as a controlled-release fertilizer-based product, designed to halt the growth of poa and encourage the growth of desirable species.

Stay on schedule

Like other technological developments in the turf industry, it has taken several years for PGRs to get up to speed with the turf manager's needs. While manufacturers were striving for seven or eight weeks of growth suppression, with reduced mowings, the maintenance contractor simply wanted a temporary solution to the peak growth during April or May. PGRs' benefits continue beyond spring, and help keep crews on schedule during peak growth seasons.

Clippings and other yard debris make up an estimated 17 to 20 percent of waste going into U.S. landfills...for now.

Using PGRs on highly-managed turf allows the grass to be put "on hold," in its best condition. This is a new realization, since prior marketing strategies had targeted less maintained, lower quality turf. Discoloration was a down-side risk that had to be overcome before PGRs could be accepted in well-maintained lawns. But by reducing the dose of active ingredients, "spoon-feeding," or sequential applications, a tank mix of two different active ingredients, and proper timing can minimize or eliminate off-color. Liquid iron-nitrogen product may also provide this added benefit.

Points to consider

Growth regulators should be used in low-traffic areas (not to be mistaken with "no-traffic"). More diligence is also needed when scouting for turf insects or diseases.

These pests may not be noticed in untreated grass, but may cause more pronounced symptoms if left uncorrected in PGR-treated grass because the turf may not be able to grow past these problems. Also, sprinkler volume may need to be reduced, so that

Dan Rosen, president of Paragon Lawns in suburban Minneapolis and his wife/partner Jill, use an Embark-Limit combination at industrial parks. The product delivers five weeks of regulated growth.

slower-growing grass isn't overwatered.

Inhibiting the stem and seedhead development can be an important benefit. Timely treatment is required: generally, no later than the second or third mowing in the spring, or seedhead formation will have already begun in Kentucky bluegrass or tall fescue.

Turf quality tends to decline once the grass starts throwing seedheads, which the plant continues to do for some weeks, even when they are repeatedly mowed off.

Some lawn care companies and maintenance contractors are offering PGRs to condo/homeowner associations and homeowners with low-traffic ornamental lawns. Turf maintenance bills are lower, and contractors can offer lower bids when a PGR is part of the program.

Reports from the field

Gator Lawns of Baton Rouge, La., sprayed PGR treatments on a number of residential St. Augustinegrass lawns last season.

-"We used a pint of Embark 2S plus 2.75 gallons of amine compatible liquid iron per acre and got around seven or eight weeks slowdown in grass growth," says manager Mike Spalding.

"Two to four cuttings were enough to keep the PGR-treated lawns looking as good as neighboring lawns mowed seven or eight times."

Removing more than 1/3 to 1/2 of the grass blade can be stressful to grass plants.

"Whacking off four to six inches of grass in one cutting just isn't treating the lawn or your customer right, no matter what your excuse may be," says Dan Rosen of Paragon Lawns, a total-care landscape maintenance contractor in Edina, Minn. Rosen manages office parks and industrial plant lawns with a light rate of mefluidide and a tank-mix of mefluidide and amidichlor.

Rosen feels the mefluidide alone, costing under $20 per acre and providing three to four weeks of growth suppression, can be used to "tame" the peak season growth, when the client wants weekly mowing.

He says the tank-mix gives up to six weeks duration of slowed growth, and allows Paragon to cut mowing in half.

Renovation aid

PGRs can be used during turf renovations, when the new grass is slit-seeded into existing turf. You can use a PGR to put the existing grass on hold, followed within a few days by overseeding. The absence of significant competition from existing grass allows the new seedlings to better compete for nutrients, moisture and light for several weeks, and reduces mowing damage. The original lawn returns to normal within five to six weeks.

In southern climes, golf greens can be sprayed with a PGR to suppress

TABLE 1

Fine Turf Plant Growth Regulators

	PRODUCT	MODE OF ACTION	PURPOSE/EFFECT
TYPE I GROWTH REGULATORS Suppress or inhibit growth and development	• Amidochlor: LIMIT® (PBI/Gordon Corporation) • Mefluidide: EMBARK® (PBI/Gordon Corporation)	Suppresses growth and development by interrupting cell division and cell elongation at the crown. For control of tiller and seedhead formation. LIMIT - Root absorbed EMBARK - Leaf absorbed	Effective for controlling growth, tillering and seed-head formation. Post suppression greening occurs.
TYPE II GROWTH REGULATORS Suppress growth only	• Flurprimidol: CUTLESS® (DowElanco) • Paclobutrazol: Scott's TGR® (O.M. Scott and Sons Co.)	Often referred to as *anti-gibberellins* which reduces growth by suppressing internode elongation. Tiller development and growth continues, but new plants are dwarfed. Both-Root absorbed	Used to control growth, enhanced greening, by concentrating chlorophyll, and turf thickening. Reduces competition of *Poa annua*.

Table adapted from materials published by Dr. John Kaufmann, Monsanto Ag Co.

WHAT'S OUT THERE: TWO TYPES OF GROWTH REGULATORS

Type I regulators: slower growth, seedhead suppression

If applied to emerging seedheads in spring, Type I growth regulators suppress turf growth and inhibit seedhead development. Applying PGRs before nutrient flow kicks in spares the root system from energy and mass depletion.

"The turf topgrowth is suppressed (not stopped), and the roots remain viable when using most PGRs," says Dr. Bruce Branham of Michigan State University's department of crops and soil science.

According to Branham, since the foliage is only slowed, photosynthesis remains active. The energy produced is stored in the roots and stem bases. Therefore, Branham explains, when the regulator wears off, a deeper green color occurs, due to the release of pent-up energy.

Embark Lite, a newly-approved, Type I mefluidide label from PBI/Gordon, adapted for fine turf uses by reducing the active ingredient, can also be used alone as a "mowing aid."

Duration of control is rate-related, but is generally targeted for three to four weeks of growth suppression. This application can make a significant difference in mowing ease and reduced clippings, especially if the application is timed to periods when grass growth and mowing pressure are the greatest. PBI/Gordon says the product can be used with good results in spring and fall, in most areas.

Of all the PGRs, mefluidide is probably the favorite product for tank-mixing with other growth regulators. It provides seedhead suppression at low rates, which is often a shortcoming of other PGRs.

A newly-developed tank mix recommendation for fine turf combines Embark Lite with amidochlor (Limit), the fine turf regulator developed by Monsanto and recently acquired by PBI/Gordon. Tank-mix directions reduce the label rates of each product, which provides a substantial margin of safety. There is generally no phyto or browning even when overlaps or over-applications occur.

Type II: density, color for poa control

Golf course superintendents favor regulators which enhance turf color and density. Of these, DowElanco's Cutless and Scott's TGR Poa Annua Control are technically referred to as anti-gibberlins. Initially meant for bentgrass greens and fairways, these PGRs are now noted for their contributions to density, color, playability and clippings reductions.

The growth reduction action of Type II PGRs has been referred to as a "miniturization" of the above-ground parts of the grass plant.

Scott's TGR (paclobutrazol, or PP333), has been well-received by the golf industry. More than 3,000 courses have used the product, says Jim Fetter, O.M. Scotts & Sons' vice president of professional products.

In addition to its fertilizer-based TGR Poa Annua Control, Scotts has a new, 50-WP sprayable formulation, TGR Turf Enhancer.

DowElanco's Cutless (flurprimidol) is used by superintendents for increased green-up, improved surface density and reduced clippings, says Mike Shaw, DowElanco's product development manager. With Cutless, sequential application is recommended.

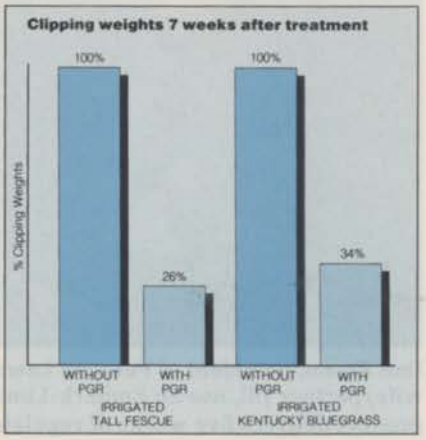
"Instead of applying Cutless all in one blow, spreading out the applications delivers the product to the plant as it needs it," says Shaw. Besides the added turf quality, Shaw says the use of Cutless in greens and fairways increases bentgrass populations.

Doug Obermann□

existing warm-season bermudagrass, followed by overseeding with ryegrass, *Poa trivialis* or other winter grasses. In spring, winter putting surfaces can be suppressed to help "release" the growth of dormant bermudagrass.

One of many tools

The benefits of PGR use for professional turf management increase as the problems facing the turf manager increase.



Says one manager: "We need something that can keep the turf growing slower, maintain green color, and not cost an arm and a leg.

"There is no one panacea, but what can help is a program for improved mowing equipoment, fertility (via slow-release N), efficient watering and plant growth regulation. These are the tools which will help our industry survive." **LM**

Doug Obermann is product sales specialist for plant growth regulators at PBI/Gordon Corp. He received his Master of Science degree in agronomy from Iowa State University.

It's only a matter of time

You know that good turf deserves the best forms of nitrogen. That's why you need slow-release NITROFORM® and controlled-release NUTRALENE™, two superior formulations that cater to your specific nitrogen needs.

With NITROFORM,® nitrogen is released slowly throughout the growing season and remains available to roots for one year or longer–when other nitrogen sources have been used up. Ideal for sandy soils where low micro-organism levels and leaching are often a problem. It also works well in clay soils since it stimulates micro-organisms that decompose thatch. Available in both dry and liquid formulations and applied at recommended rates with conventional equipment, NITROFORM won't burn top-growth or roots. So treated turf is subjected to less stress. As a result, it grows stronger and needs fewer pesticide applications.

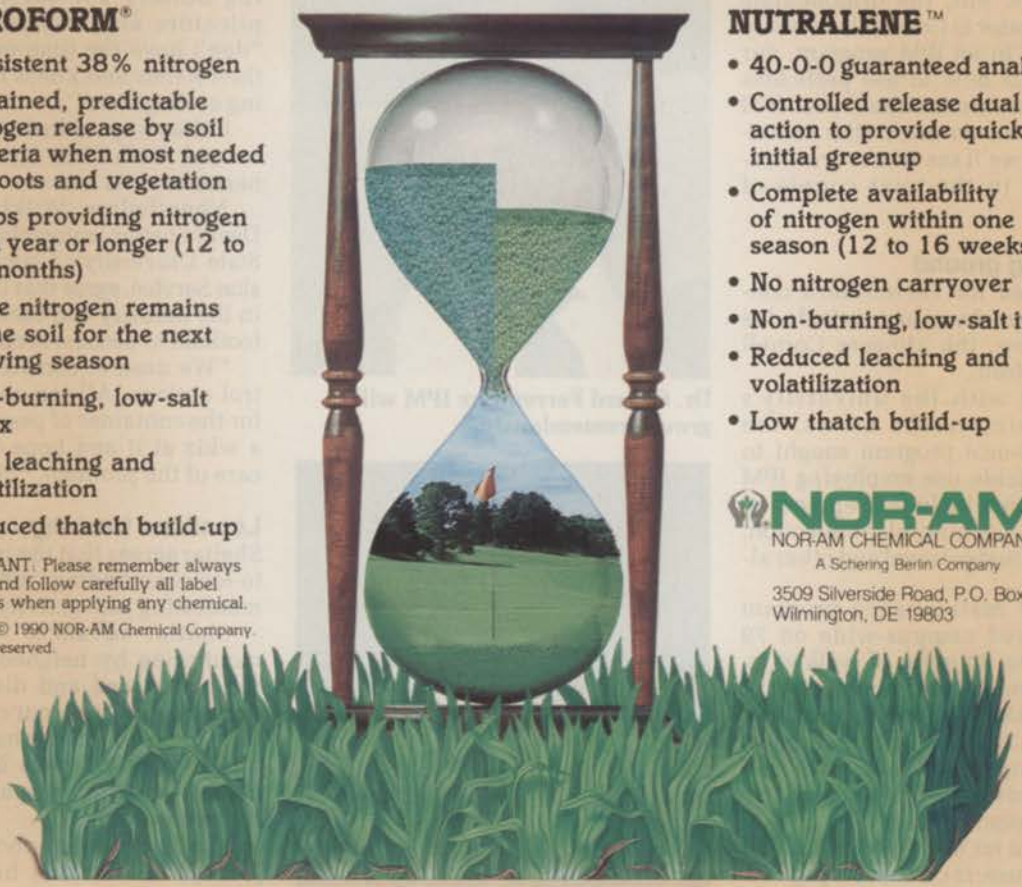
With dual-action NUTRALENE,™ you can count on quick grass greenup in spring plus sustained release throughout one growing season. Unlike other controlled-release nitrogens, NUTRALENE is not solely dependent upon soil temperatures, moisture, coating or particle size for its optimum release pattern. Applied in chip or granular form, the dual release of NUTRALENE encourages outstanding growth response–even in early spring or late fall. In hot weather, its reduced leaching characteristics enable uniform, sustained feeding to continue.

NITROFORM®

- Consistent 38% nitrogen
- Sustained, predictable nitrogen release by soil bacteria when most needed by roots and vegetation
- Keeps providing nitrogen for a year or longer (12 to 16 months)
- Some nitrogen remains in the soil for the next growing season
- Non-burning, low-salt index
- Low leaching and volatilization
- Reduced thatch build-up

IMPORTANT: Please remember always to read and follow carefully all label directions when applying any chemical.

Copyright© 1990 NOR-AM Chemical Company. All rights reserved.



NUTRALENE™

- 40-0-0 guaranteed analysis
- Controlled release dual action to provide quick initial greenup
- Complete availability of nitrogen within one season (12 to 16 weeks)
- No nitrogen carryover
- Non-burning, low-salt index
- Reduced leaching and volatilization
- Low thatch build-up

NOR-AM
NOR-AM CHEMICAL COMPANY
A Schering Berlin Company
3509 Silverside Road, P.O. Box 7495
Wilmington, DE 19803

Now's the time to rely on NITROFORM® and NUTRALENE™ for high quality Nitrogen.

Circle No. 126 on Reader Inquiry Card

IPM: ON THE VERGE OF ACCEPTANCE?

Integrated pest management is gaining ground in some circles as the industry realizes it's not meant to 'do away' with anything.

by Jack Simonds, contributing editor

Run the Integrated Pest Management (IPM) issue up the flagpole and see how it flies.

The IPM banner has been flapping heartily in the winds as researchers, industry watchers and green industry practitioners alike enjoy a robust debate over IPM: its mission, its benefits, even its definition.

To hear Dr. Gerard Ferrentino tell it, IPM methods have not simply carved a niche in the landscaping industry. IPM in on the verge of a full arrival.

"There is no doubt that pesticides work and are an important tool," Ferrentino says. But, the ornamentals IPM coordinator at Cornell University also notes: "In an IPM program, our main focus is how to use pesticides better and maximize their use. *IPM does not mean do away with chemicals.* I think we'll see its use grow tremendously in the next couple of years."

The proving ground

The test area for Ferrentino's conclusions came from just outside his office window: the 310-acre Cornell University itself.

Working with the university's ground maintenance crews, the turfgrass science program sought to reduce pesticide use employing IPM methods which include soap and oil applications, pruning, plant selection, vacuuming, turf removal and other alternatives.

The pest maintenance program was employed campus-wide on 79 acres of trees, 20 miles of walkways, 12 to 15 miles of roads and about 114 acres of parking lot space; a good mix of land uses in a concentrated space.

"(Alternative) methods work and when applied at the right time are safe to use," Ferrentino asserts.

IPM, if not on the verge of full and widespread use, is certainly a popular commodity on the conference curcuit. Scarcely a conference in the green industry convenes without IPM figuring prominently on the agenda.

IPM is hot stuff, to be sure, but for the "mom-and-pop" landscape manager, the question remains: Is IPM a passing fancy or are today's murmurings a foreshadowing of things to come?

What's in the way?

Dr. James Wilkinson, chief operating officer with Lawnmark of Hudson, Ohio, says "practical obstacles" still exist for widespread IPM use.

Wilkinson believes that some stumbling blocks remain:

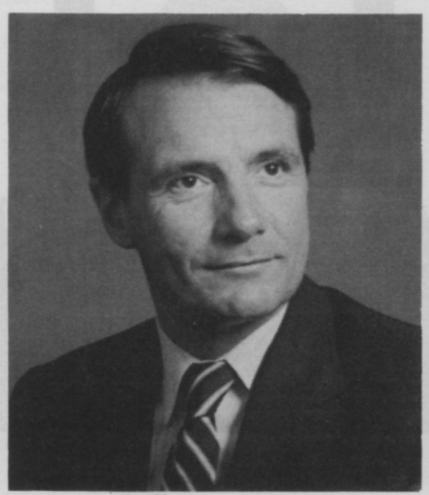
- **Customer expectation.** In some cases, Wilkinson argues, homeowners finding the lone dandelion or single grub will insist on a new, lawnwide spraying, which "flies in the face" of the intent of IPM.
- **Employee training.** With the inherent high turnover in the lawn care industry, keeping a "true practitioner" of IPM on staff can be difficult.
- **Follow-up monitoring.** Here, Wilkinson notes that with many landscaping firms basing profits on number of lawns or square feet serviced in a season or simply the amount of billing dollars per season, field applicators and technicians simply "don't have the time to get down on their hands and knees to do monitoring or diagnosis."

Follow-up monitoring, all connected with IPM agree, is a cornerstone to its success.

Nonetheless, Wilkinson and Dr. David Shetlar, entomologist with Ohio State University's Cooperative Extension Service, agree that IPM has a place in the industry and time may allow its foothold to become firmer.

"We need to consider all the control options. All too easily we reach for the container of pesticide and take a whiz at it and hope that will take care of the problem," Sheltar says.

Dr. Gerard Ferrentino: IPM will grow "tremendously."



Dr. James Wilkinson: Customer demands often run counter to IPM.

Localized tracking

Sheltar agrees that the industry needs to focus on finding "efficient ways of monitoring pest activity."

Shetlar advances the notion of monitoring by neighborhood, charting pest, weed and disease infestations which may occur commonly to a localized area and perhaps employing billbags, pitfall traps or other nonchemical techniques as dictated by common sense.

Shetlar laments about the "hose jockey" or "nozzle head" characterization of the green industry; IPM makes sense, he says, when one considers that "no one single control will succeed."

continued on page 70

NATURAL ORGANIC

Milorganite®

FERTILIZER

America's Number One Natural Organic Fertilizer

- Many of the finest parks and grounds in America are fertilized with Milorganite.
- Non-burning, cost-effective, turf fertilizer.
- Rich in organic iron — 4% minimum guaranteed.
- 90% Water Insoluble Nitrogen (W.I.N.), slow release nitrogen promotes vigorous growth.
- Supplies humus and improves water holding capacity of soils.
- The golf course choice.

Circle No. 122 on Reader Inquiry Card

FREE LITERATURE

Mail in the coupon below for further information or call 414-225-2222.

Please send me further information LM-F

- ☐ Milorganite's Specialty Fertilizer Program
- ☐ Milorganite's Iron — Technical Bulletin

NAME

ADDRESS

CITY STATE ZIP

( )
PHONE #

Mail to: Milorganite • P.O. Box 3049 Milwaukee, WI 53201-3049

"With a Wells Cargo Behind... You Never Look Back"

14 ft. cargoWagon® EW142

ALL YOUR GEAR...
SECURE, ORGANIZED AND READY TO ROLL

We can say, "We build the best". Our specifications sheets will back that up. But why else should you consider Wells Cargo? How about:

- Factory Service Facilities - GA, IN, TX, UT.
- US Wide Dealer & Service Network.
- A Product Designed & Built for 15 Yrs. Hard Service, and More.
- Second-to-None 3 Yr. Warranty Coverage.
- Full Line Ball-Hitch Units 6" — 32" and Up.
- Full Line Fifth Wheel Units 20' — 40' and Up.

CATALOGS
SPECIFICATIONS
CALL
1-800-348-7553
SAY YOU SAW IT IN
LANDSCAPE MGT.

WELLS CARGO SINCE 1954

WELLS CARGO, INC. P.O. BOX 728-975 ELKHART, IN 46515

Circle No. 150 on Reader Inquiry Card

IPM *from page 68*

"(IPM) is not an organic (or) biological program. It can contain both those elements. It is also not a 'no-pesticides' program," Shetlar observes.

The "no pesticides" aspect of IPM surfaces time and again as specialists gather to air out where the practice is and where it is headed.

Ferrentino, for example, pens an "IPM Corner" in a department newsletter, "Cornell University Turfgrass Times." In the fall issue, he highlighted IPM's overall definition as a preventive practice and its techniques for success which include monitoring and record-keeping, not dodging the common complaint that these elements often receive resistance because of perceptions they lower productivity.

"IPM practitioners," wrote Ferrentino, "follow fundamental pest management principles to develop strategies that integrate chemical, biological, cultural and mechanical methods to prevent or control pests."

A good working definition and one likely not to cause much consternation, it is true.

But as IPM continues as a hit on the convention circuit, it still apparently isn't playing well in Peoria. **LM**

RIDE A WALKER

Discover Fast, Competitive, Profitable Mowing

Most commercial mowing operations are using walk-behind mowers because they have concluded no rider mower is compact or maneuverable enough to mow landscaped areas. Now maintenance operators all across the country are discovering the compact, maneuverable *Mid-Size Walker Mower* fits their job and saves labor (usually cuts labor 1/2). The labor saving *Walker* looks good whether your business is trying to produce profit or is operating on a budget. Write or call for a free brochure. Ask for a demonstration.

Walker Manufacturing Company, 5925 E. Harmony Road, Ft. Collins, Co 80525 · 1-800-279-8537

Circle No. 149 on Reader Inquiry Card

There's more to a Grasshopper than zero-turning-radius!

ENDURANCE

We build Grasshopper mowers tough because there's no place in your busy schedule for downtime. And since we're certain Grasshopper will be around to deliver many productive hours to your mowing operation, we also make sure they are easy to operate and easy to service.

The exclusive "designed for turf" Gemini dual-hydrostatic direct drive system in our 700 Series mowers delivers more horsepower for more efficient mowing. The Gemini drive system is compact, efficient, and designed to reduce maintenance and extend service life. It delivers silky-smooth responsiveness and instinctively natural controllability with a feather-light touch of comfortable foam-padded dual-lever controls. The combination of Grasshopper's distinctive low-profile outfront deck design and zero-turning-radius lets you reach in, trim closer, and easily handle close encounters with a clear view, confidence and continuous, uninterrupted motion. ***Grasshopper — first to finish...built to last!***

The nationwide Grasshopper dealer network offers you strong support and the most complete line of outfront zero-turning-radius mowers in the industry.

For free literature and the name of your nearest Grasshopper dealer, write or call today!

Model 411R	Model 1212	Model 718	Model 718K	Model 720	Model 721	Model 721D	Model 725
11 hp Wisconsin-Robin	12 hp Kohler	18 hp B & S	18 hp Kohler	20 hp Onan	21 hp Kubota Gas	20.9 hp Kubota Diesel	24.5 hp Kubota Gas
35" or 41" Deck	44" Deck	44" - 61" Decks	44" - 61" Decks (Grasscatcher Optional)	44" - 72" Decks	44" - 72" Decks (ROPS Optional)	44" - 72" Decks	44" - 72" Decks (ROPS & Grasscatcher Optional)

The Grasshopper Company • One Grasshopper Trail • P.O. Box 637 • Moundridge, KS 67107 • Phone 316-345-8621 • FAX 316-345-2301

OUTFRONT SINCE 1970

GRASSHOPPER®

YOUR NEXT MOWER

©1990, The Grasshopper Company

Circle No. 109 on Reader Inquiry Card

Growth Regulation for Fine Turf in the Environmental Age

Using Embark® PLANT GROWTH REGULATOR to reduce top growth and clippings

Now, with new formulations of Embark and tank mixes with Limit®, you can *tame* the growth of turfgrasses and reduce the mowing by up to 50% — or you can *slow* it down just enough to make regularly scheduled mowings easier and faster. In either instance, there are no concerns with objectionable discoloration, and the reduction in cost is very significant.

Everett Mealman, President
PBI/Gordon Corporation

The Embark PGR programs for growth regulation of fine turf are surely the most important developments to date in landscape management. They can dramatically increase the productivity of turf managers ... and productivity, of course, is the ultimate generator of profits.

The recommendation for maximum growth suppression of cool-season fine-turf species is a tank mix of Embark Lite and Limit.

Embark Lite (Mefluidide) is specially formulated and labeled for use on fine turf. And Limit is amidochlor, the root-absorbed turf growth regulator developed by Monsanto and recently acquired by PBI/Gordon.

This easy-to-handle tank mix, when applied to cool-season grasses prior to the major growth period, will reduce the number of mowings up to 50% for five to six weeks at a cost of approximately $45.00 per acre — the average cost of one mowing.

But that's only part of the good news: Turf discoloration is avoided with this combination, when used as directed. At the end of the six-week cycle when untreated turf tends to fade, the release of pent-up energies in the Embark Lite/Limit-treated turf results in a rich, vibrant green color.

And, notice, we haven't even mentioned the environmental bonus of reduced clippings.

On the other end of the Embark programs, an application of just Embark Lite will by itself slow down the growth for three to four weeks to such a degree that the mowers will virtually float over the turf ... clippings will be significantly reduced ... you'll be able to stay on schedule even during the peak growing season ... and the cost will be only $18.00 per acre.

What users say

Paragon Lawn of Edina, Minnesota is typical of the many turf management professionals throughout the country who are using Embark. Paragon is a total landscape management company owned and operated by the husband-wife partnership team of Dan and Jill Rosen.

The business is oriented toward high-visibility commercial properties in the Minneapolis suburbs, where immaculate turf is a vital part of the image the property owners want to project to the public.

A typical area where Jill and Dan Rosen, of Paragon Lawn, use Embark Lite. For approximately $18.00 per acre they can literally take the fight out of cool-season grass, so that even in the peak growing period they not only can stay on schedule but the mowed premises will maintain their freshly cut appearance longer.

On several properties, Paragon has total responsibility for designing and executing the complete program on an annual bid basis. "Such property owners don't really care what we do or when we do it," says Rosen. "The issue is that a constant image of quality and neatness be maintained."

In such instances the Rosens factor into their bid an Embark Lite/Limit tank mix treatment twice a year. Once in the spring, ahead of seedhead emergence, and a repeat prior to the fall growth season.

"It reduces our mowing costs by more than 50%, at a cost of less than $45 per acre, while actually improving the appearance of the grass . . ." states Rosen.

On the other hand, Paragon has many customers who are on a regular mowing schedule. "We get paid a flat fee per mow," says Rosen, "and at the peak of the growing season it can be a real back breaker to stay on schedule and maintain a manicured appearance."

"This is where Embark Lite is ideal. During the peak growing season, we can definitely put money in the bank by spending $18 per acre out of our own pocket for a treatment of Embark Lite that lasts three to four weeks. It eliminates double mowing . . . it makes clipping clean-up a breeze . . . it takes pressure off men handling the mowers . . . and, best of all, it keeps us on schedule."

Interestingly, the Rosens were hesitant about getting started with Embark, and actually had a gallon in their machine shop for a year before they opened it. Like so many turfgrass professionals, the concept of suppressing growth made them uncomfortable in light of the fact that they had always measured turf quality and health on the basis of how vigorously it was growing.

Consequently, the Rosens started out very cautiously and tested both the Embark Lite/Limit tank mix and the Embark Lite *mowing aid* program in low-profile areas and expanded the total commitment as the evidence became overwhelming.

The Beauty of Embark Lite/Limit Tank Mix

Above: John Van Haften, director of research and development for PBI/Gordon, demonstrates the dramatic effectiveness of an Embark Lite/Limit tank mix. This test plot of bluegrass and ryegrass in suburban Kansas City was treated on April 25, 1990. It was mowed once, on May 1 after the PGR kicked in, and never touched again until this photo was taken on May 25. This dramatic reduction in growth occurred in spite of abundant rainfall and excellent growing temperatures.

Embark is the original, undisputed leader of all PGRs for use on turfgrass. It is foliarly absorbed and translocated to the growing points of a plant, and redirects the energy to the roots, thus preventing seedhead development and stem elongation.

For almost ten years, Embark has been virtually unchallenged for use on low-maintenance turf such as roadsides and hard-to-reach areas.

But use of Embark on highly visible fine turf was not recommended until 1986, when PBI/Gordon researchers, as well as several universities, had proven that tank mixes of Embark and Ferromec® AC Liquid Iron could eliminate the problems of turf discoloration.

Limit, on the other hand, is root absorbed and has been recognized from its inception as *the* PGR for maximum growth suppression on fine turf without problems of discoloration. The major drawback was its cost.

Happily, a tank mix consisting of reduced rates of both Embark Lite and Limit has proven to be the perfect marriage. It results in growth control for five to six weeks; control of seedheads and stem elongation; reduction of clipping volumes; strengthening of the roots . . . and all of this for only $45 per acre.

New Tank-Mix Combo!

Special Get-acquainted Offer on Embark Lite and Limit

Offer consists of a Combo Pack containing two 1-quart bottles of Embark Lite and one quart of Limit. When tank mixed, this combination will treat one acre of cool-season turfgrass and will give you a clear and rapid understanding of what Embark Lite/Limit can do for you. And the evidence will reach you in time to expand the program yet this year, beyond your original test area. See your PBI/Gordon distributor or . . .

Call toll-free 1-800-821-7925.

pbi/gordon corporation

1217 WEST 12th STREET
P.O. BOX 4090
KANSAS CITY, MISSOURI 64101

EMBARK® LITE

FINE TURF REGULATOR

743(N)-191

Embark®, Limit®, Ferromec® are registered trademarks of PBI/Gordon. © 1991, PBI/Gordon Corporation

MANAGE SALT, MANAGE STRESS

An understanding of the potential salt effect of the various fertilizer materials can help the turf manager prevent fertilizer burn.

by William Knoop, Ph.D., Texas A&M

A crucial element of fertilizer selection is knowing that plant availability of essential elements is influenced by a fertilizer's salt index.

Fertilizer burn, certainly, is the extreme end result of adverse osmotic pressure in the soil solution. But high salt index fertilizers cause other plant problems that do not show up as dramatically as turf burn. Factors other than salt index should be understood by those serious about managing turfgrass against damage and stress.

A turf manager usually chooses a fertilizer based on such factors as cost, availability and—perhaps—its physical characteristics. But another characteristic associated with each of the nutrient-containing chemicals should be considered before selecting a fertilizer. This characteristic concerns the method through which nutrients become available to the plant.

Nutrients enter the plant through its roots as it draws water from the soil (from what is technically called the soil solution). So nutrients must first become part of the soil solution, regardless of whether they were applied as a liquid or a solid. That is, the nutrients must sooner or later become a part of the soil solution in order for them to be used by the plant. But even once the nutrients are part of the soil solution, they won't necessarily move into the plant through its roots. The determining factor is osmotic pressure.

Osmotic pressure

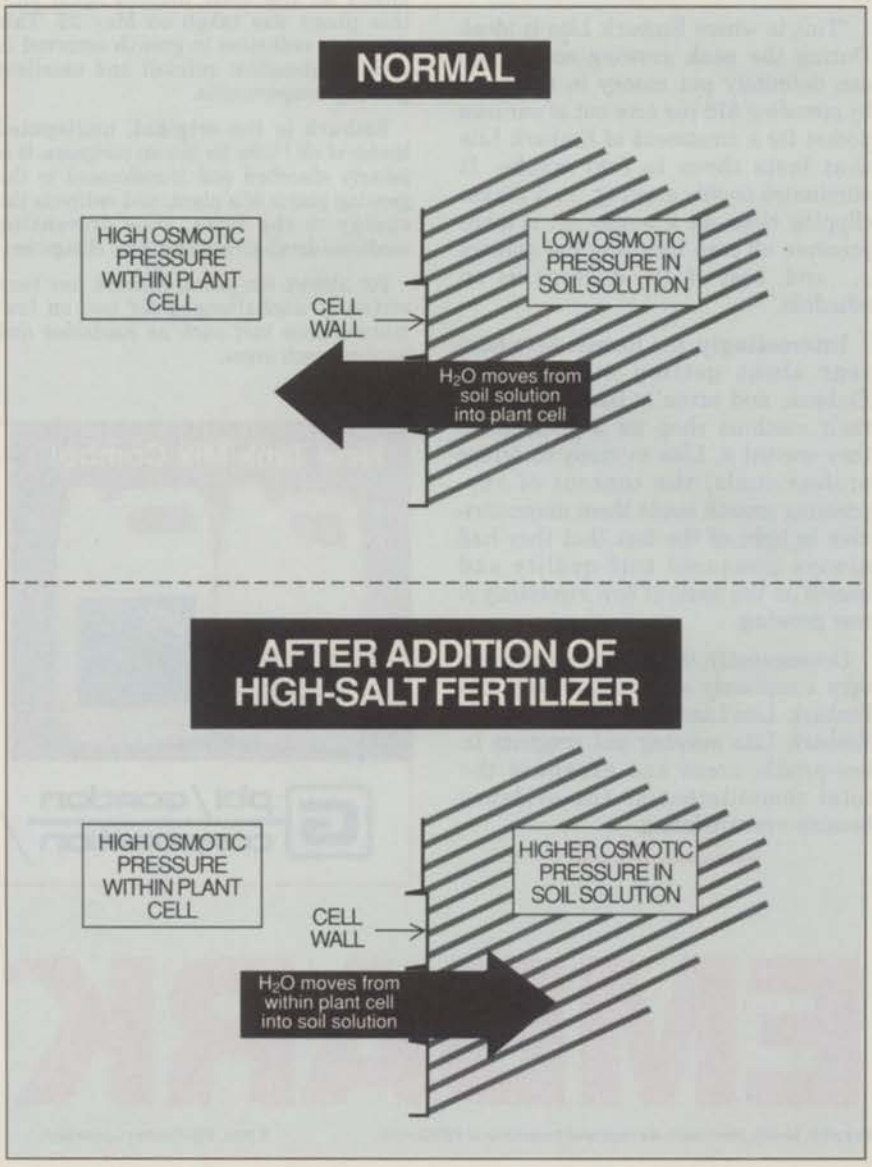
What is osmotic pressure and what does it have to do with the movement of nutrients? Osmotic pressure, in a sense, is a measure of how tightly molecules of water are held together in a solution, the very solution in which turf nutrients have dissolved.

The nutrient-containing chemicals in fertilizers are salts. As salts, they can change the osmotic pressure of a solution, and therein lies at least a potential concern. In order for roots to take up water, it must pass through a cell membrane. This process is only possible when the osmotic pressure of the cell sap is higher than the osmotic pressure of the soil solution outside the cell (Figure 1).

Influences on pressure

Water moves out of a solution that has a *low* osmotic pressure (like the soil solution) and into a solution that has a higher pressure (like plant root cells).

For water to move into plant root cells, the osmotic pressure within the roots must be higher than the osmotic pressure of the soil solution. On the


NORMAL
HIGH OSMOTIC PRESSURE WITHIN PLANT CELL
CELL WALL
LOW OSMOTIC PRESSURE IN SOIL SOLUTION
H_2O moves from soil solution into plant cell
AFTER ADDITION OF HIGH-SALT FERTILIZER
HIGH OSMOTIC PRESSURE WITHIN PLANT CELL
CELL WALL
HIGHER OSMOTIC PRESSURE IN SOIL SOLUTION
H_2O moves from within plant cell into soil solution

other hand, if a fertilizer causes an increase in the osmotic pressure of the soil solution above that of the cell sap, water is withheld and may actually be withdrawn from the plant. The result is called "fertilizer burn."

Virtually every fertilizing chemical—organic or inorganic—can cause some increase in the soil solution's osmotic pressure, with effects ranging from minimal to serious. Of course, the rate at which any material is applied has a profound effect on the osmotic pressure. The term "salt index" has been devised to help evaluate a given material's potential to change osmotic pressure.

Watering in a fertilizer helps move soil moisture and dissolved nutrients into root cells.

The salt index of sodium nitrate is given the value of 100 (see Tables 1 and 2) and all other materials are compared to the effect of an equal amount of sodium nitrate. The higher the salt index, the greater that material's potential to increase the soil solution's osmotic pressure and thus burn potential. As indicated in Tables 1 and 2, there are wide difference in the salt indices for commonly-used turf fertilizers.

Note that Table 1 also lists the salt indices of selected nitrogen fertilizers in terms of single units of nitrogen (based on application on a unit basis, lbs./1000 sq.ft.). Although a material such as ammonium sulfate (21 percent nitrogen) has a lower salt index than urea, the salt effect of applied urea is lower because it contains a higher percentage of nitrogen (45 percent).

Consideration should also be given when selecting a potassium source. Note that the salt index of potassium suilfate (0.9) is less than half that of potassium chloride (1.9). Additionally, potassium sulfate is a source of sulfur, a nutrient that turfgrass generally requires at levels similar to those of phosphorus.

Other factors

Burn potential is not totally dependent on the fertilizer's salt index. Moisture status of the soil and the turfgrass plant is also important. If the soil is not very moist, a fertilizer will have a proportionally increased effect on elevating soil solution's osmotic pressure

Watering in a fertilizer increases the volume of the soil solution. This beneficially reduces the osmotic pressure of the soil solution and helps move soil moisture and dissolved nutrients into root cells.

In well-drained soils, however, heavy water applications may also harm the plant by leaching nutrients past the root system. Different nutrient sources also have different rates of potential for leaching. For example, research in Florida has shown that fertilizer applications are exposed to stresses from any of several outside factors such as drought, heat or disease.

Sulfate of potash (SOP) leaches from the rootzone at about one-half the rate of potassium chloride.

Both air temperature and humidity influence a plant's water status and water requirements. That is, as air temperature increases, the plant requires more water. And as humidity decreases, the plant requires more water.

As the osmotic pressure of the soil solution increases, less water is available to the plant. Watering in a fertilizer may increase the water available to the root system by decreasing the osmotic pressure of the soil solution; but it may have the unintended effect of reducing the plant's water requirements by cooling the plant and increasing the humidity of the plant's micro-environment.

Application rates

Soluble fertilizer materials may be used at any time of year with minimal risk of damage to turf, if the factors that contribute to burn are understood. The salt index of a fertilizer material is extremely important, especially when the fertilizer is highly soluble. The rates of application must be lower when a fertilizer with a high salt index is used.

Fertilizers with a low salt index should be used when soil test results indicate that the soil already contains excessive levels of soluble salts or when turfgrass stands receiving a fertilizer application are exposed to stresses from any of several outside factors such as drought, heat or disease. **LM**

Table 1

Nitrate Salt Index

Material	Approx. % N	Avail-- ability	Salt Index	Salt Index per unit of N
Sodium Nitrate	16	Fast	100	6.3
Ammonium Nitrate	33	Fast	105	3.2
Ammonium Sulfate	21	Fast	69	3.3
Potassium Nitrate	14	Fast	74	5.3
Calcium Nitrate	12	Fast	53	4.4
Urea	45	Fast	75	1.7
IBDU	31	Slow	5	0.2
Ureaformaldehyde	38	Slow	10	0.3
Sulfur Coated Urea	38	Slow		*
Natural Organic	5	Slow	4	0.8

*The salt index for sulfur coated urea is the same as urea on a material unit basis, but the salt index is moderatd for SCU over a longer time period.

Table 2

Salt Index Values for Other Fertilizers

Material	Approx. % N	Salt Index	Salt Index per unit of N
Superphosphate	20% P_2O_5	8	0.4
Muriate of Potash	60% K_2O	114	1.9
Sulfate of Potash	50% K_2O	46	0.9
Dolomite	30% CaO	1	—
	20% MgO		
Gypsum	33% CaO	8	0.2
Epsom Salts	16% MgO	44	2.7

QUICKIE-QUIZ

Pre-emergence weed control in lawns

ED. NOTE: Answers to all questions can be found in this month's Pre-emergence Weed Control Guides.

1. Cool-season grasses thrive in the:
a) spring and summer
b) spring and fall
c) summer and fall

2. When first established, cool-season lawns should be given plenty of extra:
a) nitrogen
b) phosphorus
c) potassium
d) all of the above

3. To avoid weed establishment, you should not:
a) apply pre-emergence herbicides
b) mow too low
c) fertilize
d) none of the above

4. Spring aerification should be avoided because:
a) it brings weed seeds to the surface
b) the grass is too wet
c) the turf hasn't yet re-established itself
d) none of the above

5. Which is the only herbicide that can control annual weeds in cool-season grasses at the time of lawn establishment?
a) isoxaben
b) benefin
c) siduron

6. The first really effective post-emergence herbicide for controlling annual grasses in cool-season lawns was:
a) ethofumesate
b) oxadiazon
c) pendamethalin
d) fenoxyprop-ethyl

7. A major problem in the Midwest three of the last four years has been:
a) dry autumns
b) wet summers
c) wet autumns

8. MSMA and DSMA are effective pre-emergence herbicides.
a) true
b) false

9. The need for pre-emergence herbicides should be based on:
a) observed weeds which have emerged
b) observations on site the previous season
c) making an educated guess
d) none of the above

10. The only warm-season pre-emergence herbicide registered for application at sprigging, sodding or sodding is:
a) oxadiazon
b) prodiamine
c) siduron
d) none of the above

11. It is possible to use a single herbicide for controlling weeds in both turf and ornamentals.
a) true
b) false

12. Pre-emergence herbicides in warm season areas are best applied:
a) at least two weeks before expected weed germination
b) when the dogwoods bloom
c) immediately after the first spring rain
d) the first week in March

13. Crabgrass and goosegrass germinate first in warm-season areas:
a) the last two weeks in February
b) in moist areas
c) in dry areas
d) in thin, open stands of grass

14. Applications of pre-emergence herbicides for control of annual bluegrass and certain winter annual broadleaf weeds in warm-season areas may be:
a) mid-December
b) late August to early November
c) January and February
d) none of the above

15. Pre-emergence herbicides need at least:
a) one inch of water within three days of application
b) one inch of water within one week of application
c) one-half inch of water immediately following application
d) one-half inch of water within one week of application

16. If your lawn care or landscaping company does not apply pre-emergence herbicides correctly, you will be subject to:
a) callbacks
b) dismissal
c) legal action
d) execution
e) all of the above

ANSWERS: 1.b; 2.b; 3.b; 4.a; 5.c; 6.d; 7.a; 8.b; 9.b; 10.c; 11.a; 12.a; 13.d; 14.b; 15.d; 16.a (but in some cases, e!)

Turf Blazers
JUST BUILT BETTER

LOOK closely at two of the reasons we build them better.

Grease can be applied at the *top* of the blade shaft. Deck cover is easily removable.

All Steel Spindle, 1¼" blade shaft with ¼" blade offer superior strength and are the *heaviest* in the industry.

Rugged and durable, the Turf Blazer Commercial Rotary delivers day in and day out dependability. Provides high production and increased profits for your business.

See your Turf Blazer Dealer for a test drive on your turf.

Manufactured by HOWARD PRICE TURF EQUIPMENT

18155 Edison Avenue
Chesterfield, Mo. 63005

Circle No. 280 on Reader Inquiry Card

Keeping residential landscapes weed-free

by Evert Burt, Wayne Currey and John Burt

The most desirable features of weed control programs in landscape sites are all the practices and procedures that have a positive impact on plant growth in the landscape and a negative impact on weeds.

The encroachment of weeds into a turf is usually the result of a poor turf rather than the basic cause. Weeds commonly establish where the turf is thin and weak. Thin turf usually results from poor species selection for the specific site and improper maintenance practices.

Consider the level of maintenance that will be provided. Although bermudagrasses are considered the most attractive in Florida, they require the highest level of maintenance to look their best. If not properly maintained, bermudagrass will not provide as attractive a turf as St. Augustinegrass. In other words, a well-maintained St. Augustine lawn will provide a better and more attractive turf than will a poorly-maintained bermudagrass.

When selecting a turfgrass, consider the following factors:

● **Shade.** Some turfgrasses, such as St. Augustine, will grow well under moderate shade conditions, while others such as bermudagrass, will not.

● **Soil Conditions.** Turfgrasses vary in their ability to grow in different soils. St. Augustinegrass tolerates high salt; bahiagrass doesn't. Some turfgrasses grow little or not at all on poor, acid soils while others grow much better under the same conditions.

Other environmental factors such as soil texture, the presence of a hardpan, and the degree of slope may influence the selection of turf species.

● **Climate.** Temperature, degree of shade, and air drainage can greatly influence turfgrass growth. Tolerance to these various influences should be considered in the selection process.

Proper cultivar selection

Choosing cultivars not adapted to the particular site usually results in weak, thin turf that is soon followed by the appearance of weeds. Use high quality seed, sod, plugs or sprigs from the outset.

Seed or vegetative material should be planted in soil that is free of perennial weeds. If such weeds are present, consider using a total vegetation control such as glyphosate or fumigate the site prior to planting.

A lawn that is cut too short will eventually thin out and require adjustments in fertilization practices.

Determine the level of maintenance. One cannot achieve putting green quality at a roadside maintenance level. An important consideration in turfgrass selection is the turf manager's ability and willingness to supply the appropriate maintenance to keep the grass in a healthy condition. A dense, healthy stand of grass can be maintained best by adhering to good horticultural practices of mowing, watering, fertilization and pest control.

Mowing is the most basic and universal practice for maintaining a healthy, vigorous and attractive turf.

Reacting to weeds by applying a herbicide usually does not solve the problem. A wiser, more practical approach is to determine why the turf is thin and weedy. Correcting the basic problems of unhealthy turf is a vital part of a sound weed control program that will help prevent future weed problems. Healthy turf is more tolerant of herbicides than is a weak turf. At the same time, healthy weeds are easier to kill.

The common cause

Lack of proper maintenance is the most common cause of weedy turf. Mowing is the most basic and universal practice for maintaining a healthy, vigorous and attractive turf, but it is frequently done improperly.

It is important to realize that all the primary cultural practices—mowing, irrigation and fertilization—are interrelated. If one of the cultural practices is done incorrectly, it will affect the others.

For example, by mowing the turf too short, the grass develops a shallow root system, which will require more irrigation. A lawn cut too short will eventually thin out and require adjustments in fertilization practices. Before changing cultural practices, consider what effects the action will have on total maintenance. **LM**

Evert Burt, Wayne Currey and John Burt are ornamental horticulture consultants based in Ft. Lauderdale, Fla.

For Best Results All Season Long Apply Just

Prills Shown Actual Size

Introducing ONCE™—A line of controlled release turf and landscape fertilizers that require *only one application* per season.

ONCE was developed using Grace-Sierra's Osmocote® resin-coated nutrient technology, the leading controlled release fertilizer worldwide.

ONCE is engineered for professionals who install or maintain high visibility landscapes. Whether on golf courses, sports fields, private residences, or around City Hall, ONCE insures optimum turf and ornamental performance month-to-month.

ONCE Delivers Performance:

- *Produces Even Turf Growth—Uniform results month-to-month.*
- *Delivers Consistent Color—Eliminates the "feast or famine" color changes typical of conventional fertilizers.*
- *Insures Nutrient Availability—Delivers nutrients daily in the amounts needed for optimum growth.*

ONCE Saves You Money:

- *Lowers Labor Costs—Fewer applications needed per year.*
- *Increases Efficiency—Maintenance is easier to predict.*
- *Reduces Errors—Chance of over or under feeding with multiple applications is eliminated.*

ONCE is available now in a variety of analyses and 5-6 or 8-9 month longevities.

Call us at 800-492-8255 for the name of the Grace-Sierra Landscape Distributor in your area.

ONCE, the first true season long fertilizer whose time has come!

GRACE SIERRA

© 1990 Grace-Sierra Horticultural Products Company. ONCE and Osmocote are trademarks of Grace-Sierra Horticultural Products Company for its brands of controlled release fertilizers.

Circle No. 153 on Reader Inquiry Card

JOBTALK

Supers find conservation, efficiency in PGRs

In the never-ending challenge to maintain healthy, good-looking turf, many golf course superintendents are searching for new and more efficient ways to promote and maintain quality turf while conserving water and using labor more efficiently.

Brae Burn C.C.

Dennis Flynn, superintendent at Brae Burn Country Club in Purchase, N.Y., recently began using Elanco's Cutless 50W plant growth regulator.

Flynn first tried Cutless on his 10th fairway, which was thick with *Poa annua* and needed much watering. After several years' use, he now estimates that water use has been reduced by about 10 percent. The turf transpires less, he says, which reduces turfgrass water use so irrigation frequency can be reduced.

Middle Bay C.C.

Growth regulators can can also reduce mowing frequency.

"With Cutless, we probably reduced our clippings by about 50 percent during the four to five weeks of growth suppression in the spring," says Flynn. "We were able to ease off our regular seven-day mowing schedule and only cut three times a week." Flynn has also lowered the mowing height from 3/4- to 1/2-inch because of the increased amount of bentgrass on the fairways. As a result, equipment use and labor have been reduced, especially in the spring, when workers are better employed cleaning up the course, working on bunkers and getting the course ready for play.

Conserving water

New projects at the Middle Bay Country Club in Oceanside, N.Y. have included application of growth regulators on bentgrass fairways. Superintendent John Carlone selected two fairways to treat because of their contrasting locations. "One was inland and the other was along the ocean," Carlone explains. "The links portion of our course gets a lot of sea breeze and has a sandy soil profile. I applied Cutless on both areas to see if there was any difference in its activity. I haven't seen any significant differences in its effectiveness or growth reduction capabilities in either area. It seems to work well under all the conditions here."

Both Carlone and Flynn mention reduced watering as a great benefit of using Cutless. Carlone has been able to use less water every time he irrigates treated fairways. He says that before using a growth regulator, it was not uncommon for him to water each fairway 20 to 25 minutes per night. That time has been reduced to 12 to 15 minutes. Areas adjacent to the ocean still require more due to drying effects.

Bentgrass thrives

Flynn says his fairways contain more bentgrass now than before he used Cutless. He estimates a 50 percent increase in bentgrass population, and a shorter, denser turf in fairways.

By using Cutless in conjunction with lightweight mowing, proper aerification, overseeding and verticutting, Carlone says he has improved the bentgrass/*Poa* ratio to about 60/40 on the ninth fairway and 70/30 on the 16th fairway. Four years ago, he was looking at a mere 10 percent bentgrass population.

Carlone and Flynn report a slight yellowing of the turf immediately after treating it with Cutless. This is a temporary side-effect, as the growth regulator soon takes effect and the bentrass gradually becomes denser. **LM**

Olathe TURF CARE EQUIPMENT

Field Proven Olathe Equipment For The Landscape Professional!

Reliable, durable and innovative Olathe sweepers, blowers and chippers have been helping keep turf and grounds maintenance programs under control for over 16 years

Model 166E/HL

Model 48HL

Model 65

Model 166E/HL Turf Sweepers

Tow-behind models powered by 18 hp Briggs & Stratton, 20 hp Onan, or PTO. Raise/lower reel height from operator seat. 5 cu. yd. hopper with 9' high-lift or ground level dump.

Model 48HL Turf Sweeper

Self-propelled sweeper with 4 ft. swath picks up wet or dry grass clippings, leaves, thatch, rocks and other debris. 1¼ cu. yd. hopper capacity and 5½' hydraulic high-lift dump activated from seat.

Model 65 Turf Sweeper

Economically sweep large wet/dry areas for debris. PTO-powered, chain driven with 5 cu. yd. capacity hopper. Features 5 ft. swath, two-reel rubber finger pickup system, ground level dump.

Call or write your local Olathe/Toro dealer for free demonstration!

OLATHE MANUFACTURING, INC.
100 INDUSTRIAL PARKWAY, INDUSTRIAL AIRPORT, KANSAS 66031
913-782-4396 FAX 913-764-1473

Circle No. 127 on Reader Inquiry Card

LANDSCAPE MANAGEMENT
SERVING GOLF AND LANDSCAPE PROFESSIONALS

Subscription Fax

free

Complete this form today and fax it to: 218-723-9433

I wish to receive (continue receiving) LANDSCAPE MANAGEMENT free of charge:
YES ☐ no ☐

Signature _____ **Date** _____
Name (please print) _____
Title _____ **Phone No. (_____)** _____

Your Firm's Name _____
Business Address _____
City _____ **State** _____ **Zip** _____
Do you wish to receive promotional materials? YES ☐ NO ☐

1. BUSINESS & INDUSTRY

My primary business at this location is: (Check only one in either A, B, or C)

A. LANDSCAPE/GROUND CARE AT ONE OF THE FOLLOWING TYPES OF FACILITIES:

0005 ☐ Golf courses
0010 ☐ Sports complexes
0015 ☐ Parks
0020 ☐ Rights-of-way maintenance for highways, railroads & utilities
0025 ☐ Schools, colleges & universities
0030 ☐ Industrial & office parks/plants
0045 ☐ Condominiums/apartments/housing developments/hotels/resorts
0050 ☐ Cemeteries/memorial gardens
0060 ☐ Military installations & prisons
0065 ☐ Airports
0070 ☐ Multiple government municipal facilities
☐ Other type of facility (specify)
_____
_____

B. CONTRACTORS/SERVICE COMPANIES/CONSULTANTS:

0105 ☐ Landscape contractors (Installation & maintenance)
0110 ☐ Lawn care service companies
0112 ☐ Custom chemical applicators
0125 ☐ Landscape architects
0135 ☐ Extension agents/consultants for horticulture
☐ Other contractor or service (specify) _____
_____

C. SUPPLIERS

0205 ☐ Sod growers
0210 ☐ Dealers, distributors
☐ Other supplier (specify) _____
_____
_____

2. WHICH OF THE FOLLOWING BEST DESCRIBES YOUR TITLE? (Check only one)

10 ☐ EXECUTIVE/ADMINISTRATOR—President, owner, partner, director, general manager, chairman of the board, purchasing agent, director of physical plant
20 ☐ MANAGER/SUPERINTENDENT—Landscape/ground manager, superintendent, foreman, supervisor
30 ☐ GOVERNMENT OFFICIAL—Government commissioner, agent, other government official
40 ☐ SPECIALIST—Arborist, forester, architect, consultant, agronomist, pilot, instructor, researcher, horticulturalist, certified specialist
50 ☐ OTHER TITLED AND NON–TITLED PERSONNEL (specify) _____

PRODUCTS

New fertilizer more organically based

Humax Corporation has developed an organically-based line of fertilizers for lawns, gardens, golf courses, parks and other settings.

Humax, based in Salt Lake City, Utah, uses a patented colloidal process that efficiently uses nitrogen, phosphate and potassium and combines these nutrients with organic material present in the soil.

The firm says nutrient leaching is lessened and a reactor process breaks down organic waste within a matter of minutes into humic acid. The company says plant root systems' feeding capacity is increased through use of the fertilizer.

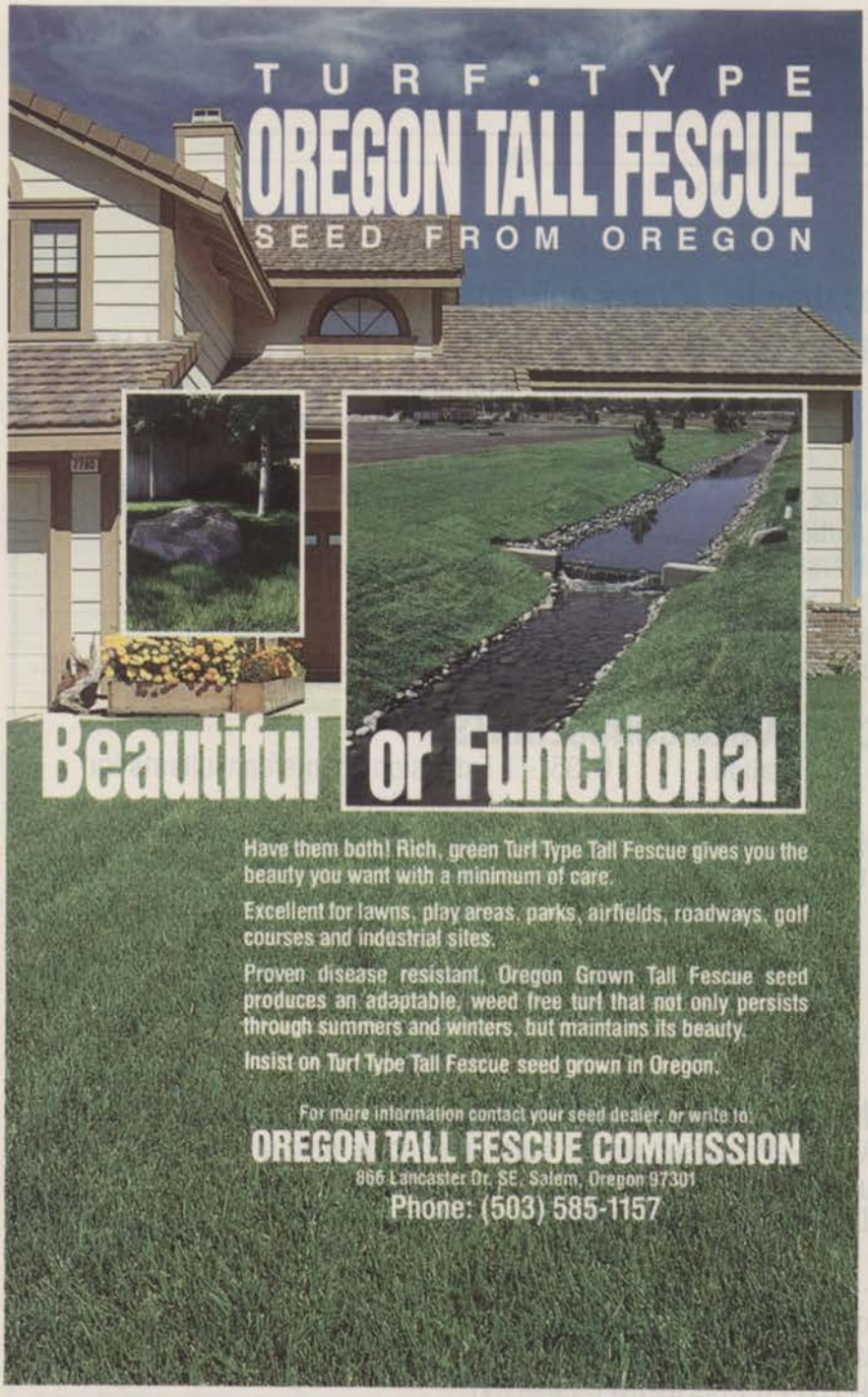
Circle No. 190 on Reader Inquiry Card.

Spreader carrier simplifies portal to portal transport

External Spreader Carriers of Little Rock, Ark., has designed a spreader carrier to fit most common broadcast type equipment.

The carrier, developed to avoid interior fertilizer spills from spreaders while in transport, comes with two adapters to accomodate LESCO, Spyker and Ev-N-Spred models and other popular designs. The device is affixed to the rear bumber of the service vehicle. It is easily installed and more than 200 pounds. The unit weighs 21 pounds.

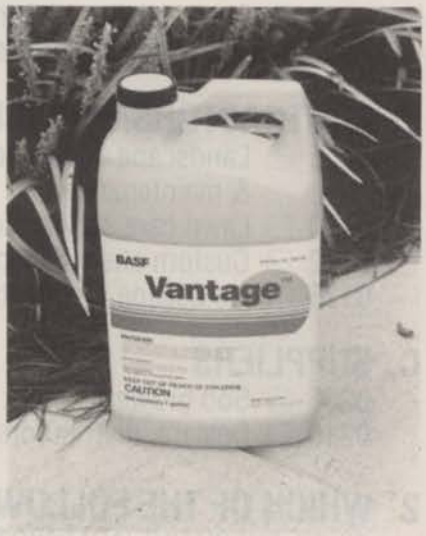
Circle 191 on Reader Inquiry Card


TURF • TYPE
OREGON TALL FESCUE
SEED FROM OREGON
Beautiful or Functional
Have them both! Rich, green Turf Type Tall Fescue gives you the beauty you want with a minimum of care.
Excellent for lawns, play areas, parks, airfields, roadways, golf courses and industrial sites.
Proven disease resistant, Oregon Grown Tall Fescue seed produces an adaptable, weed free turf that not only persists through summers and winters, but maintains its beauty.
Insist on Turf Type Tall Fescue seed grown in Oregon.
For more information contact your seed dealer, or write to:
OREGON TALL FESCUE COMMISSION
866 Lancaster Dr. SE, Salem, Oregon 97301
Phone: (503) 585-1157

Circle No. 128 on Reader Inquiry Card

Ornamental herbicide controls grass growth

BASF Corporation announed registration with the EPA of Vantage, a new herbicide for control of annual and perennial grasses in nurseries, ornamentals, ground covers, Christmas trees and general indoor and outdoor sites.



Vantage can be used on control of seedling johnsongrass, smooth crabgrass, seedling tall fescue and goosegrass as well as perennials as bermudagrass, rhizome johnsongrass and quackgrass.

A California label for Vantage is pending.

Vantage enters the grass through foilage. Growth slows and stops

If You Knew How Little it Costs To Buy & Run a National You Wouldn't Buy any Other Triplex!

Before you make a final purchase, check the true value National Mowers offer. Call today for a FREE video.

(612) 646-4079

★ ★ ★

NATIONAL MOWER COMPANY

SINCE 1919

700 Raymond Avenue
St Paul, Minnesota 55114
FAX (612) 646-2887

Circle No. 125 on Reader Inquiry Card

B20: SPACE SAVING STAMINA

Kubota's first-of-a-kind B-20 diesel tractor may surprise you. Imagine the power and performance of a Tractor/Loader/Backhoe with the versatility to maneuver in small spaces!

The B-20 is powered by a Kubota 20 HP liquid-cooled diesel engine. Hydrostatic transmission, integral power steering, and standard 4WD make the B-20 easy to move around a job site. The quick attach backhoe is driven hydraulically and includes an automatic return-to-dig mechanism.

The durable B-20 meets the needs of building contractors, landscapers and others who perform loader, backhoe and light construction work. This compact Kubota will give you full size performance.

For more information, write to Kubota Tractor Corporation, P.O. Box 7020, Compton, California 90224-7020.

Kubota assures top quality by designing and manufacturing all key components.

Kubota®

Circle No. 115 on Reader Inquiry Card

within two days, the company says, and the plant reddens, its leaf tips burn and burn back of the foilage follows.

Circle No. 192 on Reader Inquiry Card

Adustable arc sprinker to cover lots of space

The I-40-ADS arc sprinkler by Hunter Industries is now available in two models.

The units may be set between 40 and 360 degrees while water is on or off. Model I-40-36S is also available for

areas requiring a fixed 360 degree full circle. Both models come with five interchangeable nozzles which vary both radius and discharge rates. Discharge rates range from 7 to 25.3 gallons per minute and the radius may be varied from 45 to 67 feet.

Other features include safety-cushioned rubber covers and stainless steel risers. A 1 5/8 exposed diameter surface is equipped with a heavy-duty retraction spring. Standard is a drain check valve which checks up to a 15 foot change in elevation. Both models come with a five-year, over-the-counter warranty.

Circle No. 193 on Reader Inquiry Card

Gear drive enhances transmission life

A "lo-torq" drive system offered by Exmark Manufacturing Co. promises to lengthen transmission life on the company's 5-speed mowers.

The gear drive can simplify maintenance and reduce downtime, the company says. Exmark's 5-speed line of mowers also come equipped with a posi-track pulley system and double idlers on wheel drive belts.

Exmark says these features provide for maximum maneuverability and prevent downhill runaway.

Circle No. 194 on Reader Inquiry Card

Safety feature offered for Ransomes middies

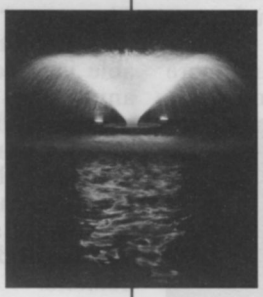
Ransomes Inc. announced recently that all Bob-Cat mid-size mowers

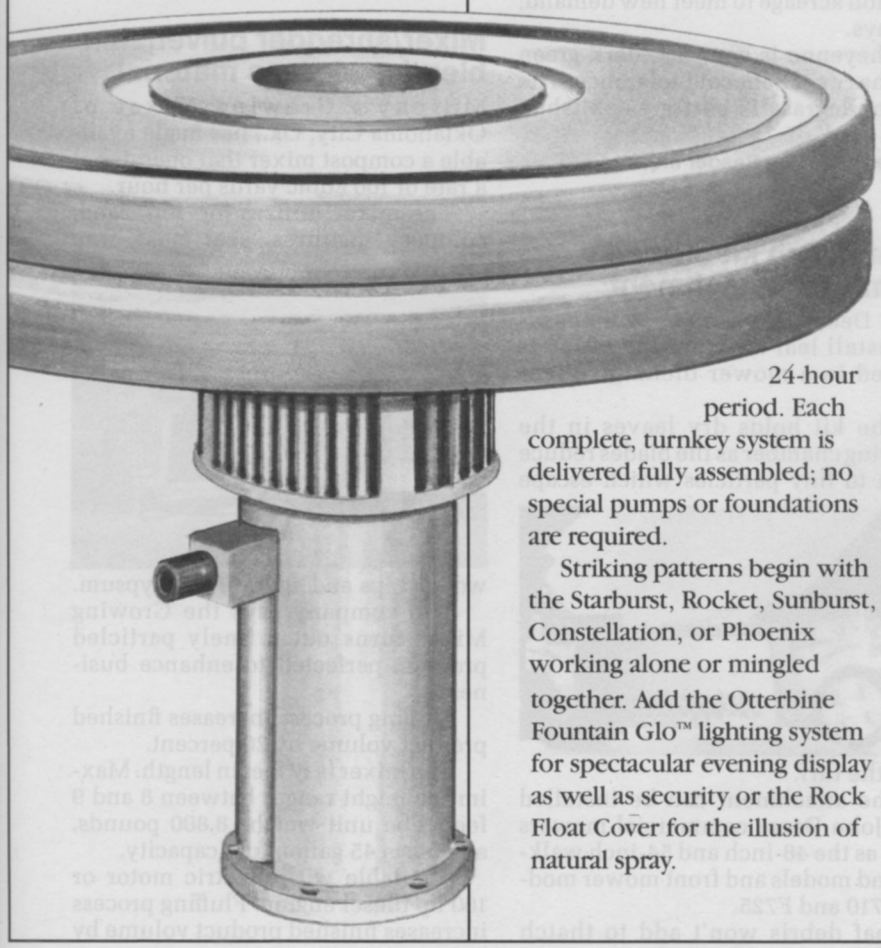
Troubled waters?

Otterbine Aerators

The prescription for troubled breathing, poor circulation, and changing temperatures in ponds and lakes is practical engineering that is esthetically pleasing.

These aerators range in power, circulating from 600,000 to 20 million gallons of water in a 24-hour period. Each complete, turnkey system is delivered fully assembled; no special pumps or foundations are required.





Striking patterns begin with the Starburst, Rocket, Sunburst, Constellation, or Phoenix working alone or mingled together. Add the Otterbine Fountain Glo™ lighting system for spectacular evening display as well as security or the Rock Float Cover for the illusion of natural spray.

Otterbine Aerators meet the water management needs of golf courses, parks, recreational lakes, office developments, and residential condominiums. Call or write for more information:

Barebo Inc.
R.D. 2, P.O. Box 217
Emmaus, PA 18049

215/965-6018

OTTERBINE® BAREBO, INC.

"See us at GCSAA show, Booth No.837-843"

Circle No. 102 on Reader Inquiry Card

manufactured before 1989 may be equipped with operator present controls.

The control stops the engine if the mower's blade has been engaged and the operator releases grip on the handle.

Installation of the control is offered at a special price to Bob-Cat owners. Details on conversions are available at authorized Ransomes/Bob-Cat dealers.

Circle No. 195 on Reader Inquiry Card

New herbicide controls bahiagrass as it sprouts

O.M. Scott & Sons Co. has released DMC Weed Control to combat bahiagrass growth in bermudagrass areas.

DMC also fights foxtail and more than 25 broadleaf weeds, including

chickweed, henbit, dandelion, wild garlic, white clover and plantain.

The granular herbicide is applied as a foliar spray and the company can provide application timing a rate flexibility.

Circle No. 196 on Reader Inquiry Card

Three patents granted for plant disease detection

Agri-Diagnostics Associates has been granted three patents for monoclonal antibodies that detect plant diseases.

The inventions can detect *Pythiaceae*, including several phytophthora and pythium diseases, *Sclerotinia homoecarpa*, related to dollar spot disease and *rhizoctonia*, causative agent of diseases on turf and other crops.

The antibodies are being used to develop rapid and low cost tests for diseases in soil and plant tissues. The firm has already marketed REVEAL tissue testings kits used in fungal diseases in turf. Also a soil test for Phytophthora root rot in soybeans is available. In development are soil and tissue Phytophthora tests for apples, peaches, tomatoes, peppers, citrus, avocado and berry crops. Phytophthora, pythium and rhizoctonia development tests are underway in nursery and greenhouse crops and rhizoctonia in rice and cotton.

Circle No. 197 on Reader Inquiry Card

Bermudagrass seed is available in spring

Cheyenne "turf type" Bermudagrass from Pennington Seed will be available in good quantity, the company announced. Production fields at Pennington's affiliate Cactus Seed Company near Roll, Arizona, has delivered the seed as expected.But Pennington vice president Ronnie Stapp says supplies could be somewhat tight due to an expected strong demand.

The firm expects to increase production acreage to meet new demand, he says.

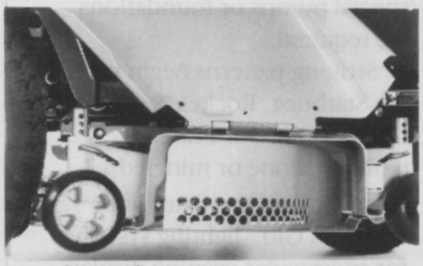
Cheyenne is compact, dark green and has excellent cold tolerance. The Bermudagrass is easily established from seed.

Circle No. 198 on Reader Inquiry Card

Leaf mulch kit offered as mower attachment

John Deere Co. is offering an easy-to-install leaf mulcher kit which is affixed to a mower dicharge opening.

The kit holds dry leaves in the mowing chamber as the blades reduce them to tiny particles which escape



into the turf.

The attachment can be installed into John Deere commercial mowers such as the 48-inch and 54-inch walk-behind models and front mower models F710 and F725.

Leaf debris won't add to thatch build up, according to the company, because leaves are chopped into fine pieces and break down quickly in the soil.

Circle No. 199 on Reader Inquiry Card

Hydraulic four-wheeler new in Jacobsen line

The Jacobsen Division of Textron's latest additon to Turfcat is the hydraulic four-wheel drive Turfcat T422D.

Each Turfcat can be equipped with a variety of attachments including front-mounted rotary mowing decks, or with fine-cut flail that eliminates grass clipping collection. Snow throwing, straight blade, rotary brush and blower attachments are also available.

Circle No. 200 on Reader Inquiry Card

Mixer/shredder pulverizes, blends, screens material

Murphy's Growing Mixer of Oklahoma City, Ok., has made available a compost mixer that operates at a rate of 100 cubic yards per hour.

The mixer utilizes top soil, sand, compost, manures, peat moss, fine

wood chips and agricultural gypsum.

The company says the Growing Mixer turns out a finely particled product, perfected to enhance business.

Fluffing process increases finished product volume by 20 percent.

The mixer is 17 feet in length. Maximum height ranges between 8 and 9 feet. The unit weighs 8,800 pounds, and has a 45 gallon fuel capacity.

Available with electric motor or 100 hp diesel engine. Fluffing process increases finished product volume by 20 percent.

Circle No. 201 on Reader Inquiry Card

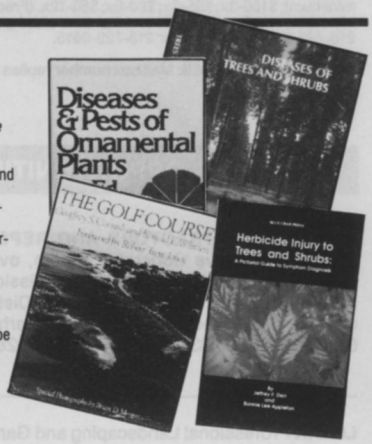
BOOKSTORE

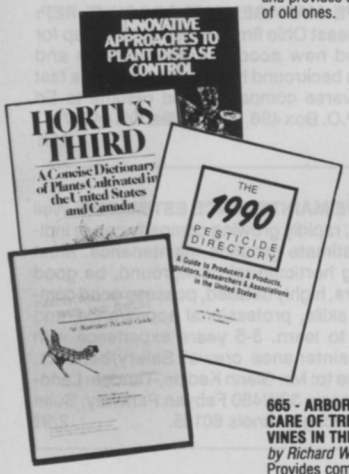
410 - DISEASES & PESTS OF ORNAMENTAL PLANTS
by Pascal Pirone
This standard reference discusses diagnosis and treatment of diseases and organisms affecting nearly 500 varieties of ornamental plants grown outdoors, under glass or in the home. Easy to understand explanations of when and how to use the most effective fungicides, insecticides and other control methods. **$39.95**

430 - DISEASES OF TREES AND SHRUBS
By Wayne Sinclain, Howard Lyon and Warren Johnson
A comprehensive pictorial survey of the diseases of, as well as the environmental damage to, forest and shade trees and woody ornamental plants in the United States and Canada. Reflects the most important developments in fungal biology and taxonomy, plant bacteriology, virology, and environmentally induced stress in plants. Summarizes information about newly discovered diseases and provides up-do-date accounts of old ones. **$52.50**

800 - THE GOLF COURSE
by Cornish and Whitten
The first book ever to give the art of golf course design its due, and golf course architects the credit and recognition they deserve. 320 pages and 150 color and black and white photographs. Traces the history and evolution of the golf course, analyzes the great courses, shows how they were designed and constructed. **$35.00**

420 - HERBICIDE INJURY TO TREES AND SHRUBS
By Jeffrey F. Derr and Bonnie Lee Appleton
Describes how to diagnose herbicide damage to nursery crops and landscape ornamentals. Injury symptoms resulting from the herbicides used today are described and compared to other plant disorders to assist in diagnosing plant problems. Tables list common names, trade names, major uses and injury symptoms for the herbicides currently used in agronomic, horticultural, landscape and noncrop areas. **$24.95**




INNOVATIVE APPROACHES TO PLANT DISEASE CONTROL
HORTUS THIRD
A Concise Dictionary of Plants Cultivated in the United States and Canada
THE 1990 PESTICIDE DIRECTORY

510 - HORTUS THIRD
from Cornell University
A 1,300 page concise dictionary of plants cultivated in the United States and Canada. A reference which every horticulture professional should have.
$135.00

415 - INNOVATIVE APPROACHES TO PLANT DISEASE CONTROL
by Ilan Chet
Brings together alternative approaches and methods that have potential to control diseases caused by fungi, bacteria and viruses. Major concepts of disease control discussed include biological control systems, their possible mechanisms, potential application and genetic improvement. **$54.95**

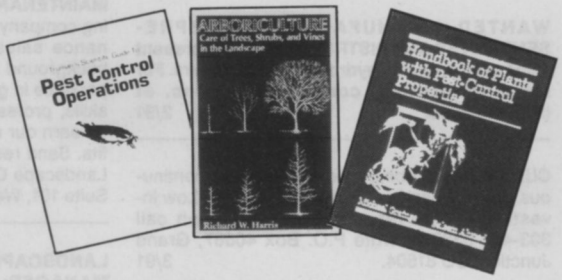
690 - INSECTS THAT FEED ON TREES AND SHRUBS
by Johnson and Lyon
Essential information for identifying more than 650 insect pests and the injuries they cause. More than 200 color illustrations. **$49.95**

500 - THE 1990 PESTICIDE DIRECTORY
by Lori Thomson Harvey and W.T. Thomson
A Guide to Producers and Products, Regulators, Researchers and Associations in the United States. For the person who needs to know anything in the United States pesticide industry. **$75.00**
Available in March 1990

125 - SCIENTIFIC GUIDE TO PEST CONTROL OPERATIONS
by G.W. Bennett, J.M. Owens, R.M. Corrigan
Fourth Edition. New chapters on fumigation, urban wildlife, special facilities, plus updated, improved chapters on pesticides, cockroaches, birds, termites, equipment, sanitation, stored product pests and more. Don't be without this updated edition.
$49.95 Domestic All Others $60.00

665 - ARBORICULTURE: THE CARE OF TREES, SHRUBS AND VINES IN THE LANDSCAPE
by Richard W. Harris
Provides comprehensive coverage of complete planting, site analysis, preparation and special planting methods, fully detailed coverage of fertilization, irrigation and pruning guidelines on preventative maintenance, repair and chemical control, how-tos of diagnosing plant problems, practical data on non-infectious disorders, diseases, insects and related pests and pest management. **$63.00**

450 - HANDBOOK OF PLANTS WITH PEST-CONTROL PROPERTIES
By Michael Grange and Saleem Ahmed
Provides information on approximately 2,400 plant species having pest-control properties in addition to the plant's specific common and family names, coded information is provided on such plant characteristics as life cycle, classification, and the ecological conditions suited for growth. Also lists 1,000 plants that are potential candidates for screening pest-control activity due to their poisonous nature or their ability to control human and animal diseases. **$49.95**

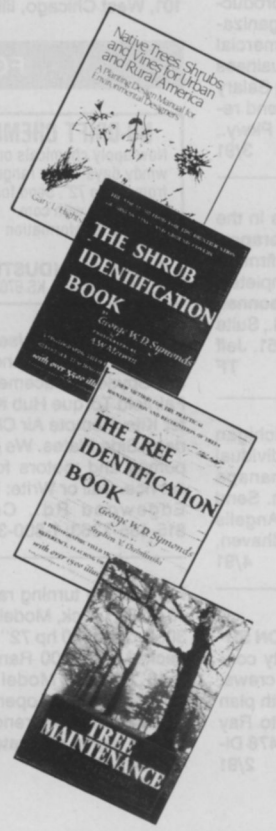

Pest Control Operations
ARBORICULTURE
Care of Trees, Shrubs, and Vines in the Landscape
Richard W. Harris
Handbook of Plants with Pest-Control Properties

400 - NATIVE TREES, SHRUBS, AND VINES FOR URBAN AND RURAL AMERICA
by Gary L. Hightshoe
This award-winning reference to native U.S. plants has now been expanded to include shrubs and vines. Over 250 major species are characterized by form, branching pattern, foliage, flower, fruits, habitat, soil, hardiness, susceptibility, urban tolerance and associate species. Includes unique color-coded keys that classify plant species by visual characteristics, cultural requirements and ecological relationships. **$86.00**

720 - SHRUB IDENTIFICATION
by George Symonds
Pictorial key to identify shrubs. Contains more than 3,500 illustrations to check specimens. Popular and botanical names are given for each shrub and handy index tabs for quick reference.
$17.95 paperback

750 - TREE IDENTIFICATION
by George Symonds
Pictorial reference to identifying trees by checking leaves, buds, branches, fruit and bark. Like its sister publication, SHRUB IDENTIFICATION, popular and botanical names are listed with index tabs for easy reference.
$17.95 paperback

760 - TREE MAINTENANCE
by Pascal Pirone
The sixth edition of this guide for anyone involved in the care and treatment of trees. Special sections on tree abnormalities, diagnosing tree troubles, non-parasitic injuries and assessing the suitability of different trees. **$45.00**


Native Trees, Shrubs, and Vines for Urban and Rural America
THE SHRUB IDENTIFICATION BOOK
THE TREE IDENTIFICATION BOOK
TREE MAINTENANCE

Mail this coupon to: Book Sales, Edgell Communications
One East First Street, Duluth, MN 55802

Name _____

Street Address _____

City _____

State _____ Zip _____

Phone Number ( ) _____

PAYMENT MUST ACCOMPANY ORDER

Signature _____ Date _____

Please send me the following books. I have enclosed payment* for the total amount.
Please charge to my Visa, MasterCard or American Express (circle one)

Account Number _____ Expiration Date _____

BOOK NUMBER AND TITLE	QUANTITY	PRICE	TOTAL PRICE

Domestic—*Please add $3.50 per order plus $1.00 per additional copy for postage and handling.

All others—*Please add $5.00 per order and if ordering multiple copies, also add $2.00 per additional copy to cover postage and handling.

Please allow 6-8 weeks for delivery.
Prices subject to change.
Quantity rates available on request.

_____ (postage & handling)

_____ Total Enclosed

Questions? Call 218-723-9471 or 9472

LM

CLASSIFIEDS

RATES: $1.25 per word (minimum charge, $40). Bold face words or words in all capital letters charged at $1.50 per word. Boxed or display ads: $105 per column inch-1x (one inch minimum); $100-3x; $95-6x; $90-9x; $85-12x. (Frequencies based on a calendar year). Agency commissions will be given only when camera-ready art is provided by agency. For ads using blind box number, add $20 to total cost of ad per issue. Send ad copy with payment to Dawn Nilsen, LANDSCAPE MANAGEMENT, 1 East First Street, Duluth, MN 55802 or call 218-723-9483. Fax Number 218-723-9615.

BOX NUMBER REPLIES: Mail box number replies to: LANDSCAPE MANAGEMENT, Classified Ad Department, 1 East First St., Duluth, MN 55802. Please include box number in address.

BUSINESS OPPORTUNITIES

WANTED: CONTRACTORS AND REPS for a proven Decorative Concrete System, over 200 dealers nationwide. Excellent commission and bonuses. Full/P.T. Write to Stampcrete Distributor of N.E., 188 Brandy Brow Road, Haverhill, MA 01830 or call (800)832-7444 or (508)374-9284. 2/91

LEARN Professional Landscaping and Gardening at home. Accredited program provides thorough training in all phases of commercial and residential landscaping. Certificate awarded. Free booklet describes program and opportunities in detail. Lifetime Career Schools, Dept. A-415, 2251 Barry Ave., Los Angeles, CA 90064. 9/91

WANT TO BUY OR SELL A GOLF COURSE? Exclusively golf course transactions and appraisals. Ask for our catalog. McKay Golf and Country Club Properties, 15485 N. East Street, Lansing, Michigan 48906. Phone (517)484-7726. TF

WANTED - MANUFACTURERS REPRESENTATIVES AND DISTRIBUTORS - to represent a line of high quality hydroseeding tackifiers. For more information, contact PRSM, Inc. at (215)430-3960. 2/91

CURB KING: Curbing machine that lays continuous concrete landscape borders. $2,695. Low investment, high returns. For information call 303-434-5337 or write P.O. Box 40567, Grand Junction, CO 81504. 3/91

HELP WANTED

LANDSCAPE MAINTENANCE SUPERVISOR position available with a rapidly growing landscape firm in Dallas, Texas. We are seeking an individual who possesses enthusiasm, sincerity and honesty, as well as leadership, organizational and production skills. In other words, a "DO WHATEVER IT TAKES" type. Extensive industry knowledge and experience, a MUST. Strong salary and benefits. Send resume and salary history to: **8222 CHANCELLOR ROW, DALLAS, TEXAS 75247, ATTN: PRESIDENT.** 2/91

TWO POSITIONS AVAILABLE: EXPERIENCED ESTIMATOR & CONSTRUCTION GENERAL SUPERVISOR. General Contractor seeking individuals experienced in estimating and site development. Supervision of personnel and dealing with governmental agencies required. Send salary and resume to: DeAngelis Contractors, 22424 Van Horn, Woodhaven, MI 48183. E.O.E. 4/91

SALE-DESIGN-ESTIMATING: A large high quality service oriented site construction corporation is looking for a highly motivated individual to join our team. Must have construction background, excellent communication skills, and a professional manner and appearance. Benefits and pay are commensurate with ability and experience. Send resume to Decorative Paving Co., 33 West 518 Fabyan Parkway, West Chicago, IL 60185. 3/91

NEED LANDSCAPE WORKERS? We can solve any labor problem you have. We have documented workers as well as foremen, leadmen, irrigators and architects available at a price you can afford. Call today! **AMIGOS 214-634-0500.** TF

Our continuing growth requires us to find qualified personnel for the following new positions: **ESTIMATOR:** 5-7 years minimum experience with emphasis in commercial estimating. Must have experience in the buy-out of plants, hard goods and sub-contracts. **PROJECT MANAGER:** Must have the ability to coordinate and manage multiple projects simultaneously. You will be responsible for communicating with major clients, management and field supervisors. Administrative skills with attention to follow-up and detail is necessary. If you are the type of individual that thrives on responsibility and can operate with little direction, we would like to hear from you. We have salaries and benefits. Please submit a resume with a cover letter and salary history to: TORRE & BRUGLIO, INC., 20401 Hall Road, Mt. Clemens, MI 48044. Attn: President. 3/91

ASSISTANT MANAGER/SALES LANDSCAPE MAINTENANCE: Well established, rapidly growing company needs individual to assist in maintenance sales. Must have strong horticultural background and sales experience; 2-5 years experience in green industry. Good communication skills, professional appearance, and willingness to learn our methods are essential. Salary/benefits. Send resume to: Mr. Glenn Kedzie, Tandem Landscape Company, 33W480 Fabyan Parkway, Suite 101, West Chicago, Illinois 60185. 2/91

LANDSCAPE MAINTENANCE PRODUCTION MANAGER: Rapidly growing Central Florida Landscape firm seeking an experienced production manager with strong people and organizational skills. Experience with large commercial accounts and a sincere desire to build a business based on customer service a must. Strong Salary and Benefits. Must relocate to Orlando. Send resume to: Mr. Khalsa, 1174 Florida Central Pkwy., Longwood, Florida 32750. 3/91

"Consider all of your employment options in the irrigation and landscape industries. Call **Florapersonnel,** the international employee search firm for the ornamental horticulture industry. Completely confidential. Employer pays fee. **Florapersonnel, Inc.,** P.O. Box 1732, 1450 S. Woodland Blvd., Suite 201, DeLand, FL 32721-1732. (904)738-5151. Jeff Brower, Joe Dalton, Bob Zahra, CPC." TF

Landscape Supervisor: Established Michigan Contractor looking for self-motivated individual with 5 years minimum experience to manage crews and oversee landscape installation. Send resume and salary requirements to: DeAngelis Contractors, 22425 Van Horn Road, Woodhaven, Michigan 48183. EOE. 4/91

LANDSCAPE MAINTENANCE PRODUCTION SUPERVISOR: Responsibilities include quality control, productivity and customer service for 5 crews. 4 years experience and hort. degree. Health plan with dental. Profit-sharing. Send resume to Ray Knoll, Western DuPage Landscaping, 31W478 Diehl Rd., Naperville, IL 60563. 2/91

LAWN CARE MANAGER: Seeking individual to coordinate lawn care operations. Responsibilities include all aspects of marketing, sales and production of all lawn care related services. 4 years experience and hort. degree. Health plan with dental. Profit-sharing. Send resume to Ray Knoll, Western DuPage Landscaping, 31W478 Diehl Rd., Naperville, IL 60563. 2/91

LANDSCAPE MANAGEMENT ACCOUNT REP: Large Northeast Ohio firm needs Account Rep for existing and new accounts. Horticulture and Agronomics backround helpful. Be a part of a fast growing, diverse company. Send resume to Ed Gallagher, P.O. Box 438, Painesville, OH 44077. 2/91

LANDSCAPE MAINTENANCE ESTIMATOR: Well established, rapidly growing company needs individual to estimate grounds maintenance. Must have strong horticultural background, be good with numbers, highly detailed, possess good communication skills, professional appearance, and willingness to learn. 3-5 years experience with grounds maintenance crews. Salary/benefits. Send resume to: Mr. Glenn Kedzie, Tandem Landscape Company, 33W480 Fabyan Parkway, Suite 101, West Chicago, Illinois 60185. 2/91

LANDSCAPE MAINTENANCE PRODUCTION SUPERINTENDENT: Well established, rapidly growing company needs individual capable of running multiple crews. Must be good with people, have a strong horticultural background, good communication skills, a professinal appearance, be highly organized, and eager to learn. 5-7 years experience with grounds maintenance. Salary/benefits. Send resume to: Mr. Glenn Kedzie, Tandem Landscape Company, 33W480 Fabyan Parkway, Suite 101, West Chicago, Illinois 60185. 2/91

FOR SALE

NO-DRIFT CHEMICAL APPLICATOR

Now apply chemicals on windy days! Sizes range from 30" to 72". Send for free packet with complete parts information and prices.

DANVILLE INDUSTRIES
Box 12 • Danville, KS 67036
(316) 962-5292
1 (800) 662-4212

SPYDERS - New/Used/Rebuilt. New Kohler engines, short blocks and a complete line of engines and Spyder replacement parts. New Style Nichols-Fairfield Torque Hub Kits, heavy duty Wilton Caster Kits, Remote Air Cleaner Kits, heavy duty Carriage Side Plates. We repair and rebuild hydraulic pumps and motors for your Spyder. Same day service. Call or Write: Mobile Lift Parts, Inc., 5402 Edgewood Rd., Crystal Lake, IL 60012. 815-455-7363; 1-800-397-7509. 3/91

Husler zero turning radius mowers: 2-Model 251 18 hp 50" deck, Model 272 23 hp 72" deck, Model 305D diesel 20 hp 72" deck, Model 262 18 hp 60" deck, Model 400 Rangewing 24 hp 1-72" deck, 2-40" decks, Model 400 D 24 hp 72" deck. *Mowers only in operation 2 seasons and have been completely renovated for a new season. Owner highly motivated to sell. Call Mr. Khalsa. 407-831-8101. 3/91

The fight against yellow nutsedge begins here.

Only Basagran® T/O ends it here.

Unlike other herbicides which only burn back yellow nutsedge above the surface, Basagran T/O herbicide travels down to control the roots, rhizomes and tuber network underground. It's the only way to be sure those same weeds won't come back.

An over-the-top application is all it takes to win the fight against yellow nutsedge and broadleaf weeds. (A second application is recommended when regrowth occurs.) And while it's tough on weeds, it's easy on virtually all varieties of established turf.

Basagran T/O is also labeled for directed sprays in ornamental varieties.

For more information on how to control yellow nutsedge and broadleaf weeds with Basagran T/O, call **Toll Free 1-800-874-0081.**

BASF Corporation

Always read and follow label directions.
Basagran is a registered trademark of BASF AG.
© 1991 BASF Corporation

BASF

Meyer Z-52 zoysia sod, bermuda-free, forklift delivery to the Mid-Atlantic region. Oakwood Sod Farm, Salisbury, MD 301-742-3086. 4/91

LAWN SEED: Wholesale. Full line of top quality grasses. Improved bluegrass varieties, tall fescues and fine bladed ryegrasses. We specialize in custom mixing. Oliger Seed Company, 89 Hanna Parkway, Akron, OH 44319. Call collect (216)724-1266. TF

REINCO HYDROGRASSERS and power mulchers in stock. Opdyke Inc. (Philadelphia Area) 215-721-4444. TF

PAUL FLORENCE Turfgrass: Quality seed for the Turf Professional. Elite Bluegrasses, Fine-Leaf Ryegrasses, and Turf-Type Tall Fescues. Custom mixing our specialty. Silva-Fiber mulch and supplies for hydro-seeders. Quality Elite Bluegrass Sod. Call us! (513)642-7487. 13600 Watkins Rd., Marysville, OH 43040. TF

High quality professional horticulture training videos. 100% satisfaction guaranteed! Call or write for a free color catalog. San Luis Video Publishing, P.O. Box 4604, San Luis Obispo, CA 93403 Tel: (805)545-5426. Fax: (805)545-5423. 3/91

FOR SALE: Blader Tanks, Well Pump, F-10, Top Dresser, and more. Call Ken Fishback 919-846-1643. Wildwood Green Golf Club. Raleigh, NC. 2/91

FOR SALE: Northwestern Indiana sod business serving the Chicago and Indianapolis markets. Includes all rolling equipment, buildings, irrigation and 1 1/2 million yards of harvestable sod on 530 acres. A profitable well established business. Call or write **WILLE & STIENER REALTORS,** P.O. Box 290, Crown Point, Indiana 46307. Attention: Gil Stiener. Phone (219)663-2990. 3/91

Finn Hydroseeders, Mulch Spreaders, Krimpers, Pit Burners, Fiber Mulch & Tackifiers. New & Used. **Wolbert & Master, Inc.,** P.O. Box 292, White Marsh, MD 21162, 301-335-9300, 1-800-234-7645. TF

PIPE LOCATOR INEXPENSIVE! Locates, traces underground drain, water pipe lines of clay, PVC, ABS, steel, cement. Finds sprinklers, valves, clogs. Bloch Company, Box 18058, Cleveland, Ohio 44118. (216)371-0979. TF

HYDRO-MULCHERS AND STRAW BLOWERS: New and used. **JAMES LINCOLN CORPORATION,** 3220 S. Jupiter Rd., Garland, TX 75041. (214)840-2440, (800)527-2304. TF

Sod, sprigs, row planting, strip sodding, solid sodding, fairway renovations, complete turn-key jobs. 16 yrs. golf course experience. 1-800-458-4756, DOUBLE SPRINGS GRASS FARM, Searcy, Arkansas. TF

FOR SALE - HYDROSEEDER - FINN TITAN 3000: Very good condition. John Deere diesel engine with 800 hours. Mounted on a 1978 Mack 685. $32,000. 216-539-4450. 2/91

'86 ROTOMIST BLOWER for sale: 500 psi bean pump powered by a 4 cyl. Ford gas engine. 250 gal. tank. Contact Mike Young at Edmonds Landscaping, Halifax, Nova Scotia, Canada, 1-902-423-8174, Fax 1-902-455-9956. 4/91

Lawn Assistant, Software and Updates thru August '90. $900. Call 918-258-3566. 2/91

THE DRI-BOX

•For Flatbed or Pickup Transport of Dry Chemical Compounds
•Easy Access Design
•6-7 Bag Capacity •Rain Proof
•Stainless Steel Hardware
•Padlockable Latch

ARROWHEAD PLASTIC ENGINEERING, INC.
2909 Hoyt Avenue, Muncie, IN 47302
Tel. 317-286-0533, ext. 40

NEW AND USED BROUWER EQUIPMENT: Mowers - VACS - Fork Lifts - Harvesters - and full line of replacement parts. Contact Glenn or Ed Markham at 1-800-458-3644. TF

ESTABLISHED LAWN FERTILIZING COMPANY for sale in Central Upper Michigan. Steady growth and solid customer base. Complete business including equipment. For further information, please call (906)474-9221. 2/91

QUALITY TURF GRASSES: Sod or sprigs. Meyer Z-52, Tifgreen II, Tifdwarf, Tifway. Sprig planting available. Quail Valley Farm, Inc. 1-800-666-0007. 3/91

BENT GRASS available for immediate pick-up or delivery. For information call Jade Run Turf and Sod Farm: 800-332-1220. 2/91

DAKOTA HAND **TREE TRANSPLANTER**

Lightweight, Variable Size Rootball (16" - 28"), Component Adaptable (sprayer, logsplitter, dump box, post-hole digger). Available in 3 models (towable, bucket mount, 3 pt.).

MID DAKOTA CORP.
Box 728 • Garrison, ND 58540
Phone (701) 337-5619 or 1-800-327-7154

USED EQUIPMENT

Two Vermeer Tree Spades: *T-44 on C-30 '82 Diesel Chevy, Like New $11,500. *T-66 on C-65 '73 Gas Chevy, $11,000. (405)842-7177. TF

NEW and USED EQUIPMENT--Asplundh, Hi Ranger and Lift-all forestry bucket trucks, Chipmore wood chippers. Mirk, Inc., (216)669-3567, (216)669-3562, 7629 Chippewa Road, Orrville, Ohio 44667. TF

BUCKET TRUCKS, Straight Stick, Corner Mount and Knuckle Boom Cranes. Brush Chippers - New Asplundh (Morbark Disc Type), New Asplundh Drum Type. Best prices anywhere. Used Chippers - Asplundh, Woodchuck, etc. 2 to 8 usually in stock. Sprayers, Dumps, Stakes, Log Loaders, Crew Cab Chip Box Dumps, Railroad Trucks, 50 in stock. Sold as is or reconditioned. Opdyke's, Hatfield (Philadelphia Area) 215-721-4444. TF

Hydrobrute 30" Tree Spade - $2,500. In good working condition, ready to go to the field. **CLOVERDALE NURSERY,** Boise, ID (208)375-5262. 2/91

BUCKET TRUCK: Hi Ranger 65', 57', 50'. Skyworkers with chip boxes. Asplundh bucket trucks with chip boxes. Asplundh brush chippers. Bean 55 gal. sprayers. Pete Mainka Enterprises, 633 Cecilia Drive, Pewaukee, WI 53072. 414-691-4306. TF

WANTED

Wanted: Gang Mowers. Jacobsen or Toros, any condition, priced accordingly. Also need Greens Mowers and Nationals, etc. 313-653-5695. 3/91

POSITION WANTED

Superintendent/Assistant Superintendent-A.A.S. Horticulture (1991) - 9 years experience, 5 years experience as assistant superintendent, warm and cool season grasses. Will relocate. For resume write Joseph B. Walsh, 117 G Forest Parkway, Valley Park, MO 63088. 2/91

Rocky Mountain and NW States-Grounds or Parks Management; B.S. Agronomy, 15 years in landscape industry managing public and private concerns. Licensed Applicator and Irrigator, good knowledge of sports turf in transition zone. Resume upon request, send SASE to: LM Box 485. 3/91

EDUCATIONAL OPPORTUNITIES

GRAYSON COLLEGE, Denison, Texas. Two-year technical program in Golf Course and Turfgrass Management. 18-hole golf course on campus. Dormitories, placement assistance, financial aid and scholarships available. Contact: GCC, 6101 Grayson Drive, Denison, TX 75020. 214-465-6030, Extension 253. 6/91

REPS WANTED

TARGET SPECIALTY PRODUCTS

SALES REPRESENTATIVE:
Great opportunity for energetic, self-motivated individual for full-time sales. Interesting and challenging work in So. California for a distributor of specialty agricultural chemicals. PCA license and/or degree in biological science required. Turf/Landscaping experience preferred. Excellent company benefits. EOE. Non Smoking.

SEND RESUME:
P.O. Box 1117, Cerritos, CA 90702

Spot your DOTS distributor...

...And get exactly what you need in a pre-emergent herbicide program. Your DOTS distributor is no ordinary "stock" person, but rather a professional who deals with specialized formulas for your individual needs.

Your DOTS distributor can help you meet your soil or turf requirements head on using specific formulations. With DOTS, you get a *true* customized blend—not a pre-packaged, "me too" mix.

Your DOTS distributor will coordinate a season-long program, enabling you to apply the types of fertilizers and herbicides you need—at your preferred application rates.

And, if you have any agronomic questions or problems, your DOTS distributor will provide soil testing to help secure answers, and then work with you to prepare an individual solution.

Choose from high quality products including TEAM,™ SURFLAN,® BALAN,® or BALAN® plus SURFLAN,® depending on your location and turf conditions.

Just look for the red dot to know you're getting the best...from the best distributor. Contact your DOTS distributor today or call **1-301-899-3535**

D. O. T. S.™

Distributor's Own Turf Supplies™

Circle No. 112 on Reader Inquiry Card

WHY ADELPHI IS FIRST CHOICE WITH EXPERTS:

■ Tests prove it has superior overall turf quality ■ Excellent density, disease resistance & rich green color ■ Consistently outperforms many newer bluegrasses ■ Early spring and late fall color retention ■ Good tolerance to drought and close mowing ■ First choice with many sod growers, stadium, golf, park superintendents and other turf experts. Get full details in technical bulletin #10.

Adelphi
KENTUCKY BLUEGRASS
U.S. Plant Pat. No. 3150

THE GREENER KENTUCKY BLUEGRASS™

For more information contact:

J. & L. ADIKES, INC.	JACKLIN SEED CO.	NORTHRUP KING CO.	VAUGHN SEED CO.	ROTHWELL SEEDS LTD.
Jamaica, NY 11423	Post Falls, ID 83854	Golden Valley, MN 55427	Bound Brook, NJ 08805 Downers Grove, IL 60515	Lindsay, Ont. CAN K9V 4L9

Circle No. 101 on Reader Inquiry Card

AD INDEX

NO.	ADVERTISER	PAGE NO.
101	Adikes, Inc., J.A.	94
102	Barebo, Inc.	85
000	B.A.S.F. Corp.	61
000	B.A.S.F. Corp.	91
103	Blue Mountain Industries	30
105	Ciba Geigy Corp./Pace	36-37
104	Ciba Geigy Corp./Triumph (Reg.)	81
106	Deere and Co., John	2-3
107	Deutz Corp.	55
108	DowElanco	53
153	Grace Sierra Co.	79
109	Grasshopper Co.	71
120	Grazer Div. of M & W Gear Co.	30
110	Great Salt Lakes Minerals	43
111	Growth Products LTD	26
112	Howard Johnson Enterprises	93
280	Howard Price Turf Equipment	77
113	ISK Biotech Corp.	31
114	Jacobsen Div. of Textron	41
116	Kalo, Inc.	44
115	Kubota Tractor Corp.	84
117	Lebanon Chemical Corp.	18
119	Lesco, Inc.	95
118	Lofts Seeds, Inc.	CV4
121	Mazda Motor of America, Inc.	19
122	Milwaukee Sewerage	69
123	Mobay Corp.	6-7
124	Monsanto Co.	CV3
125	National Mower Co. (Reg.)	83
126	Nor Am Chemical Co.	67
127	Olathe Manufacturing, Inc.	80
128	Oregon Tall Fescue Commission	82
130	PBI Gordon Corp./Embark	72-73
131	PBI Gordon Corp./Embark	72-73
129	PBI Gordon Corp./Trimec	20-21
132	Pennington Seed	27
152	RGB Laboratories, Inc.	45
133	Rhone Poulenc Ag. Co./Chipco	12-13
134	Rhone Poulenc Ag. Co./Ronstar	15
135	Rhone Poulenc Ag. Co./Ronstar	15
136	Ringer Corp.	39
137	Sandoz Corp.	56
140	Scag Power Equipment	28-29
139	Scott Proturf, O.M.	24-25
138	Seaberry Landscaping, Inc.	26
141	Sweepster Jenkins Equipment	22
142	UAP Special Products	23
143	Tee 2 Green Corp.	CV2
144	Toro Co.	62-63
146	Toro Co.	16-17
145	Turf Seed Co.	5
147	Turfco Manufacturing, Inc. (Reg.)	14
148	Vigoro Industries, Inc.	22
149	Walker Manufacturing, Inc.	70
150	Wells Cargo, Inc.	70
151	Woods Div. of Hesston Corp.	35
	Literature Round-up	
250	Belton Industries	47
251	Coron Corp.	49
252	Curv-rite Aluminum Edging	48
253	Doggett Corp.	49
254	Encore Manufacturing Co., Inc.	48
255	Feldmann Eng. and Mfg. Co., Inc.	50
276	Finn Corp.	47
256	Four Star Agricultural Services	47
257	Grasshopper Co.	49
259	Great Salt Lakes Mineral	48
260	Green Graphics	50
258	Growth Products	49
261	Landscapers' Supply Corp.	48
262	Mobay Chemical Corp.	49
263	Nor Am Chemical Co.	48
264	Onan Corp.	50
265	Permaloc Corp.	50
266	Proprietary Seeds, Inc.	49
267	Reemay, Inc.	49
268	Roots, Inc.	47
269	Ryerson and Son, Inc.	50
270	Spraying Devices, Inc.	50
271	U A P Special Products	49
277	Unimin Corp.	50
272	Valent Corp.	48
273	Vigoro Industies, Inc.	48
274	Woods Div. of Hesston Corp.	48
275	Woods Div. of Hesston Corp.	50

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Coming Soon!
New
DG Formulation

The most reliable way to control more than 30 broadleaf weeds.

LESCO bentgrass formulation also available.
Always read and follow instructions on package before using any chemical product.

For outstanding and economical wide-spectrum broadleaf weed control, one product stands alone. LESCO Three-Way Selective Herbicide.

The combined efficiency of 2, 4-D, MCPP and dicamba stops more than 30 broadleaf weeds with a single application, including tough problems like ground ivy and spurge. And just as important is the cost effectiveness of Three-Way. Why pay more for herbicides that do less?

Outstanding broadleaf weed control at an economical cost. No wonder LESCO Three-Way Selective Herbicide is still the first choice of professional turfgrass managers.

It's nice to know you can rely on an old friend. Order today. Contact your LESCO Sales Representative or call toll free **(800) 321-5325**. In Cleveland, call **(216) 333-9250**.

LESCO
ESTABLISHED 1962
20005 Lake Road
Rocky River, Ohio 44116
Fertilizers, Seed, Control Products, Equipment, Parts

Circle No. 119 on Reader Inquiry Card

PROBLEM MANAGEMENT

Diagnosing pin oak disease

Problem: *Every year we see severe leaf spot type of disease on pin oaks. Any idea what causes this? How can it be managed? (Missouri)*

Solution: Without examining the affected leaves, it is difficult to diagnose accurately. Oaks in your area as well as many parts of the country get several late season leaf diseases.

Actinopelte leaf spot is one of the most common late season leaf spot diseases caused by the fungus. Although most oaks are susceptible, pin oak is frequently the most commonly affected. This disease apparently is common in pin oaks suffering from iron deficiency and showing iron chlorosis symptoms. Symptoms of actinopelte leaf spot begin to appear in middle to late summer. The disease generally doesn't get severe until August. The fungus produces small, circular to angular reddish-brown spots which are 2 to 15 mm in diameter. The spots will coalesce and become larger, irregular areas of necrotic leaf tissue.

If the disease is severe it can cause the leaves to defoliate prematurely. The fungal agent is a weak pathogen which establishes on leaves damaged mechanically or by other diseases or iron chlorosis. Chemical control is not warranted since the infection occurred late in the growing season; the plant had a chance to produce normal sugar for the year; and damage to the tree is minimal.

Info on zoysiagrass?

Problem: *Where can I find detailed literature available on zoysiagrasses? Lawn and turf books usually cover the zoysia japonicagrass very lightly and in insufficient detail. Also, what type of scarification program should be maintained on zoysiagrass? At present, there is a thick build-up of thatch, and during the dormant period, the turf has a dark black background which is rotting cuttings and roots. These are over 30 years old and well implanted. We've been cutting the lawns to ground zero in the fall which I feel is wrong. (Italy).*

Solution: We are not aware of authoritative works on zoysiagrass. References to zoysiagrass are typically brief sections of turf books and reprints of articles. Perhaps one of our readers will be aware of a source of information. Close mowing is sometimes practiced just prior to growth in the spring to help minimize the potential for thatch and allow sunlight to warm the soil, and encourage a rapid turfgrass recovery. I am not aware of any advantages of close mowing in the fall.

For thatch maintenance, consider aerification or dethatching in the spring. Aerification is effective in maintaining the proper thatch depth but may not be effective in reducing excessive levels. Core aerification removes a small plug of soil which is deposited on the surface. Scattering the core will provide "top-dressing" which aids in microbial breakdown of thatch. Mechanical dethatching literally tears the thatch out of the lawn and in the process, injures the turfgrass.

On warm-season grasses such as zoysia, this procedure should be practiced only in the spring to allow for the maximum recovery period. Considerable debris is loosened which should be raked and discarded. If thatch is too thick to be adequately reduced by dethatching, the lawn should be renovated and then properly maintained to prevent thatch accumulation.

Preventing pine cones

Problem: *The campus at the University of Waterloo, Waterloo, Ontario is approximately 1000 acres in size. Intensive landscaping practices are required on 200 acres and maintenance is carried out as efficiently as possible. One of the problems we have with our maintenance program is with the cones from a large number of Austrian or black pines. Throughout the spring and early summer, cones cover the ground causing litter problems, particularly when mowed. Perhaps you can advise us as to the availability of some type of solution or spray which can be used to prevent the development of cones. As the trees are landscape trees, it is important that they are not damaged. It would also be desirable if the solution did not harm bees. (Canada)*

Solution: At the present time, there aren't any materials registered for the removal of cones on pines. Reports from preliminary work suggest that Chipco Florel pro brand plant growth regulator manufactured by Rhone-Poulenc is showing some promising results. However, currently it is not on the Florel label. Possibly it can be used in the near future if the label is expanded. Your best approach now would be to hand or mechanically rake the cones or prune the cone bearing branches.

Balakrishna Rao is Manager of Technical Resources for the Davey Tree Co., Kent, Ohio.

Questions should be mailed to Problem Management, LANDSCAPE MANAGEMENT, 7500 Old Oak Boulevard, Cleveland, OH 44130. Please allow 2-3 months for an answer to appear in the magazine.

News from Monsanto...

ROUNDUP®
HERBICIDE

PRICE CUT

$22 ON 2½'S!

Monsanto has lowered the price of Roundup® herbicide by $22 on the 2½ gallon container size!

That makes Roundup about $50 per gallon* in the 2½. And the price is even lower in 30's. Now you'll find even *more* value in Roundup and *more* places to use it *more* often.

Think of the budget-stretching savings Roundup can bring you compared to time-intensive string trimming. Or the labor-savings in using lower-priced Roundup to maintain weed-free beds and pine islands. Use it to eliminate brush, poison oak, poison ivy...in landscape site preparation and turf renovation.

Figure your savings at the new lower price. Then see your dealer or retailer to save on Roundup.

*Suggested retail price. Always read and follow the label for Roundup herbicide. Roundup® is a registered trademark of Monsanto Company. © Monsanto Company 1991 RGP-1-170B

Circle No. 124 on Reader Inquiry Card

Get the benefits of Wildflowers and the experience of Lofts

Marie Pompei

Wildflowers! They're a beautiful, low-maintenance alternative to mown turf. And no one can help you choose wildflowers better than Marie Pompei at Lofts.

As a wildflower specialist, Marie will consider your geographical area, the soil moisture, height of growth and time of flowering. She'll even consider colors. Then she'll recommend the specific mix to provide the best results.

If soil erosion or weed invasion are problems in your area, Marie can suggest the best companion grass. She'll also suggest how to properly manage the field for optimum floral display in the years to come.

Wildflowers need very little care. So they're perfect for roadsides, parks, golf courses, estates or industrial sites. They're ideal for areas that are hard to mow. Or any place that needs color. Try low-maintenance, natural wildflowers as your colorful alternative to high-maintenance turf. And get your wildflowers from Lofts.

Lofts has been a leader in the seed business since 1923. In fact, Lofts introduced Pinto as one of the first commercial wildflower mixtures.

Call Marie at Lofts today. She'll help you select the wildflower mix suited to your needs.

LOFTS

Lofts Seed Inc.
World's largest marketer of turfgrass seed
Bound Brook, NJ 08805
(800) 526-3890 • (800) 624-1474 (NJ)

Circle No. 118 on Reader Inquiry Card